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[For general information on the distribution of various types of flora and its relation to climate and soil, see 4: Spate AWI India, category II6, pp. 83-92.]

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[For a description and discussion of the structure and relief of the entire Indian sub-continent, see 6: Spate, AWI India, category 116, pp. 3-36.]

[For a regional division of the Indian sub-continent see Chapter XIII, 6: Spate AWl India.]

[For information pertaining to topography, see category 116, pp. 2-5, 26-43, 96-103, 111-118, 122-129, 133-139, 151-160, 192-206, 213-222, 476-481.]

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CHAPTER FOURTEEN

The States and Cities of Poonch and Jammu

To the south—slightly east—of Gilgit lies the State of Poonch, which sits between the Kashmir Valley and Pakistani Punjab, with a range of mountains to the east and the river Jhelum to the west as natural borders. It is a country of which little has been written, yet most of the visitors who entered Kashmir in the old days by the most popular road, one which runs from Rawalpindi in the Punjab to Srinagar, passed close to it, if not through it. No doubt they were concentrating upon the road, which although fairly good, has its terrors in twists, hairpin bends, blind turnings and precipices, especially when the visitor was forced to rely upon the driving judgment of car drivers or tonga wallahs whose one idea was to get to the end of the journey.

The surrounding mountains are just as magnificent as in the other parts of Kashmir—in fact are merely the other side of those viewed from the Valley, their northern slopes a mass of fir and pines. The immediate surrounding hills are strangely of the same heights, so that they appear like wave upon wave of dark green pines and fir, shaded only by the valleys or by distance. These valleys are cleft out in such a way that it would seem that the whole was once a great plateau, the softer stones and soils being washed away, and that which remains is visible formations being of the harder stone which with time has clothed itself with trees. On the tops of a number of these hills with naturally scarped faces, are the ruins of ancient forts, each so placed and planned that its position, with its inaccessibility, protected it against assaults, leaving the attackers to starve the defenders out from it. These hill forts are relics of the days when the country was divided up into small states,

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each with its own ruler. The depths of the valleys are alive with ice-cold babbling brooks which run over smooth, brown sandstone rocks, although here and there in the passage of the waters, there appears a jagged white limestone piece which has withstood all attempts to smooth its surface. From among them all, often from a rock island, trees spread their branches over deep pools which are frequently the resting place for many fish, the most popular being the mahseer, before they leave the rapids to swim up stream.

First tracks lead up from the water to lone farmhouses; here and there is to be found a wider track which cattle have made or where the loaded mule is led, for there are few roads fit for wheeled carts. Flowers grow there in profusion during the spring; small fields of corn, green in springtime, yellow in autumn, are to be discovered at odd spots, there remaining where they have been for hundreds of years. There is none of the bleakness of Ladakh, Baltistan or Gilgit, although the same steep tracks over rocks, sharp screes and descents are there, but they are fringed by bushes, trees shade them, and just when one is feeling the need of a cooling draught, a small clear spring bursts from a rocky grassy bank. Poonch reminds the man from Britain much more of his homeland than does the Valley. The Jhelum flows through the State, as does the Poonch river; a road follows this from Kotli to the city of Poonch. It seems that in so many places camping sites are to be found, small *margs* with close-cropped grass, a stream close by and a friendly if inquisitive people soon round the camp.

It is at first surprising to find the large percentage of the men among them who speak English, then as they proudly talk of their service in the Indian Army, of their father's service and their grandfathers', many of whom are still alive and draw pensions, one remembers that this little State claims to have provided a larger percentage of army volunteers than any other in India during the Great War of 1914-18. Thousands of them have always found service in the Indian Army, returning home on pension to take over the small-holding which their father has tended against that time, he then being able to retire to gossip, enjoy-mind by the stories his son has told of his own

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man who has retired from active work, his charge for grinding being a percentage of the flour. 000

Here again in this country are to be seen the fair complexions, the blue and the hazel eyes, the brown or gold-tinted hair. The men are in the main handsome, they are not so hard-looking as those of Gilgit; among the youths especially there is a blending with the rather effeminate young men of the Valley, but they are essentially men, their stride is long. They are taller than the others of the State, though not powerfully built, and it is seldom that one sees a fat Poonchi Muslim. Generally their faces are long, the complexion light brown, the nose large, aquiline and well shaped; quite frequently the black hair is wavy. In all they are a good-looking race, and this applies to both men and women, who even in their old age retain their good looks, the men then growing beards, and the eyebrows seeming to extend forward. What is more noticeable is that unlike the peasants and farmers of the Kashmir Valley and Ladakh, they are not filthy dirty; you can with safety get close to them and enter their houses. 162 515

Those who have known the men of Poonch as a soldier or as a servant—and large numbers migrated to India to work as such under British officers and residents—will agree that their foremost quality is reliability and faithfulness; as servants, if they like you, they will remain all their lives, if not, they will leave you at once, for there is a distinct line drawn between those they like and dislike. The women are not as bold as the women of the Valley; they also go unveiled; their beauty is of a different quality from those sirens over the mountains, who have a Jewish appearance. Although mostly Muslim, they do not scamper off round the corner of the house like the women of Baltistan when they see a stranger about, neither do they stand and stare at him as do those of Ladakh; they just continue with their work as though unaware of his presence, while the children run out to look at him, standing at a distance. Unlike the men of Gilgit who scowl, the men of Poonch will usually greet one with a friendly grin if not a smile. 181 562 609 609

From the smooth surface of the hard giant boulders in the Poonch Valley, it is believed that at one time a glacier moved where the river now runs, yet strangely enough on the right of 133 312

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that river bank, at Tattapani to be exact, hot sulphur springs with valuable medicinal properties are found.

According to the 1941 census, about nine-tenths of the population were of the Muslim faith. The Raja who was a Hindu, was subject to the Maharaja of Kashmir. The unwalled, oblong-shaped capital of the State is also called Poonch—in some books it is still spelt Punch, but the pronunciation is Poonch. The population is under ten thousand. The valley in which this city has been built opens up as one approaches it and is rather like a miniature Valley of Kashmir. The view is clear for miles ahead, with Poonch built on a low plateau overlooking the river which flows quietly, parallel with the hill ridges. The old fort-palace with its massive walls, seems to rise from among the hundreds of houses in the bazaar of narrow, stone-paved streets. The Raja's white-walled and red-roofed new palace is built behind them all and dominates the whole, with a background of green hills and far-distant snow peaks behind which sits Gulmarg.

The Muslim schoolboys of Poonch always remember two landmarks in the history of their city. The first is 1814, when Ranjit Singh made his attack on Kashmir through Poonch; he sought the co-operation of Ullah Khan, the then Raja of Poonch, but this ruler being a Muslim had Afghan sympathies, and gave an evasive reply to the request, pleading his inability to comply with the Maharaja's wishes since his son was then a hostage in the hands of the Durranis. Ranjit Singh's forces advanced with the Maharaja at their head; the small forces of Poonch fell back, the Raja ordering his subjects to leave the town and villages, thus cutting off supplies from the Sikhs, who however, reached Tosa Maidan in their advance. There they suffered a crushing defeat at the hands of the Afghan forces of Rajouri and Poonch. Retreating, the Sikh army burnt the fair city of Poonch to the ground.

Later, when Poonch was still an independent hill State, it was annexed by the Maharaja Gulab Singh, when he defeated the combined forces of the Afghan Governor of Kashmir and the Raja of Poonch. Then, in order to show the people of his new State that the last of the representatives of the main line of rulers would never be able to return, he had both of them

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In the foreground the fields are divided by a stone wall (p. [illegible])

[facing p. 317]

2; Gervis T-3 (no date) 1934 AVI Kashmir AVI

stop overnight if the journey is being divided up into two days; there is a State rest house with a number of private houses. The main road is joined by one from Abbottabad, one which may be used in the winter when the Murree hills are covered with snow; this road runs back to the north-west for about fifty miles to Abbottabad, and although rather narrow, is always open: it can be seen crossing the ridges above the river and towards the west. Here also the river Jhelum is joined by its largest tributary, the Kishengunga; about the same in size, both flow for a short distance side by side before marrying, then it is easy to pick out in the spring and summer months the Jhelum which is light brown with the muddy deposits it has gathered on its long passage through Kashmir, and the Kishengunga, a light, clear, greenish blue from the snows which have fed it. In the dry autumn the Jhelum is an opaque green, brought about by the large quantity of organic matter suspended in it, whilst the water of the other river is peacock shade, still clear and transparent.

In the old days petty chiefs ruled the tribes in these parts, and they were forever at war with each other, even with their neighbours across the closest ridges; yet when outsiders attacked one of them, all would join together to protect their land.

Only a day's march to the west lies the Black Mountain frontier where lived the "Yagi" Pathan tribes who made this road to Kashmir far from secure. The Frenchman Jacquemont records that in his travels, which were in 1831, he was provided by Ranjit Singh with a strong escort to save him from being taken captive, from being held to ransom, or being blackmailed.

Fourteen miles further on is Garhi, where some people prefer to stop the night, as it has another rest house, this one being rather beautifully placed in its compound just above the main road. One of the famous sights of the Jhelum Valley route used to be a great rope bridge which here spanned the river; this has now been replaced by a modern bridge. The scenery is quite different again. At three thousand feet the valley opens up; there are distant views of the wooded hills; it is genuine, familiar and not unlike the English country roads and lanes; there is a crispness in the air, so that at night a blanket is needed.

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132 no longer does one sweat and lie restless on the bed. Of that part Bernier wrote in his letters of far back in 1666, "I find myself transported on a sudden from a torrid to a temperate zone, the mountains we were traversing being covered with every one of our plants and shrubs; I had almost imagined myself in the mountains of Auvergne". And of this journey Arthur Neve commented in his book, *Picturesque Kashmir*, in 1899, "Early in April, when the wheat is ripening in Dramul, it is at Chakoti only in the ear, at Uri, though the fields are green, the deciduous trees are almost leafless and at Baramula snow may be lying in the hollows, the fields are bare, and there are all the signs of early spring". It is surprising to find poles fixed upright to the four corners of the bed, for mosquitoes are often found here, and in the autumn can be a pest to those who have not brought a net to cover the bed.

• 133 Between here and Uri there is some really lovely scenery, much of which is truly magnificent, with lofty peaks towering up on either side, the road at times making its way through narrow gorges in which the river Jhelum flows, at times placid and with great swirling pools of brownish water, at others foaming and rushing as it escapes through some close held ravine or rock, rock which is so hard that the centuries of water has not widened it, so hard that it will turn an ordinary chisel with ease.

341 712 Uri has a delightful old rest house with electricity for lights and fans, a luxury the visitor had thought might be unknown in Kashmir after the smoking oil lamps and hand fans of late. The gorge of the river before Uri is reached is so narrow that it is easy to cast a stone across it; the rocks drop vertically down to the water, the mountain sides are just like great castle battlements of rock which rise from the rushing Jhelum. The town stands on a triangular plateau which is several hundred feet above the river, and as one nears it, especially when the river is low, there are to be seen several of those sloping, plateau-like, great alluvial fans which run down to the water. Uri is nearly four thousand five hundred feet above sea level, once it was of importance, having its own Raja; now of no importance, the town has become little more than a large village. The fort is interesting though, its founder was at one

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time said to have been a common khidmutgar—that, in a table 341
boarer. He had been taken under the care of Ranjit Singh as a 712
boy of seven, became one of his generals and is credited with having overcome the Afghans, "whose women so feared him that to frighten their children they quoted his name in a low deep voice. He was a tyrant in Kashmir, from where he was called after his two years' service from 1820." So the fort is not really very old. It became the home of the Raja from that time on.

Rampur, thirteen miles off, is the next stage of the journey. 341
The road makes a great detour because of the gradient, and 491
follows the contours of the mountains, so avoiding having to 123 ●
cross the large precipitous-sided nullah; after two or three miles you are astonished to find yourself almost back to where you started, the rest house lying across it, being but an arrow-shot away. The hillsides are mostly covered with loose shale, which is a menace at all times, for the rains wash it down on to the road, whilst later when it is all dried out in the sun, the moisture which bound it no longer has its hold, and it slips, a single stone soon collecting tons of the stuff as it tumbles down the mountain side. Although one does get a few seconds' warning of its descent by the terrifying swish and rumbling of the greater boulders, that is of little use for with the echoes of the hills it is difficult to decide, in the short time, from where the sound comes. The yellowish to purple-brown rocks which have been seen all the way from Domel, have now changed to slaty schists; later along the road they are replaced by limestone, and with it the scenery changes; there is now a wild beauty, with glorious forest trees, the ground spread with ferns and flowering bushes; the hills recede, the more gentle slopes being covered with tall deodar trees, standing straight and firm. Great precipices of limestone rise up from pine forests; here and there a fir or pine will have found a foothold on some small ledge and clinging tightly beside one and upwards as though searching for its sisters who crown the hill; here the countryside is truly lovely, and as such has been mentioned right from the earliest writers. Here it is that the gallery—or flume—six miles long, carries the water which, dropping four hundred feet, powers the turbines generating electricity for the Valley. On the way there [374] ○○○

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On the Wayfarer

172 in the ruined Hindu temple which is said to date back to one century after the birth of Christ.

000 It seems here that Kashmir has at last been found, for there are walnut and chestnut trees; the flat-roofed houses are seen no more; in their place are the wooden ones with the flattish sloping roofs of Kashmir with wooden tiles or thatch. In spring wild roses of all colours, white, cream, pink and red, cover the bushes by the road side; here and there leafy trees hang out over it like great sunshades; the river widens and is quieter and although still brown, appears cleaner. It is swift in places though, for dashing against a rock in its path, the splash of spray is high; here and there quiet pools have found their way into the softer rock, and willows shade these, protecting the fish which have fought so far up stream, and making such places interesting to the fisherman. The views across the river, of the hill-slopes covered with different kinds of trees, broken by great limestone cliffs and the distant snow-capped mountains, especially when the sun streams through the clouds to lighten one like a glistening wedding cake, or when the sunset lends them for a while a pearl-pink tinge which slowly turns to red, is indeed heavenly.

361 Sixteen miles further on lies Baramula; the road, as it has
491 been for the last miles before Rampur, is comparatively level.
Peasants are to be seen more often working in the fields and
• 133 small rice patches; at parts the wide river which almost ripples
over the stone bed is slower in its flow and permits the use of
small boats. On the side are large rocks different from those
seen thereabouts and believed to have been carried down from
the mountains by glaciers long since forgotten. A narrow ravine
carries a path which leads through to Gulmarg, and here, until
recent years, were found numbers of bears. Higher up, in the
month of June, the rocks will be decorated with the pink
blooms of wild rhododendron which flourish there. Here-
abouts, especially from Naushera onwards, terrible damage was
done in the great earthquake of 1885, which is still not forgotten
in these parts. In the distance can be seen the great peak of
Nanga Parbat, eight ahead, the near seventeen thousand feet
high Mount Harmouch, which, as one gets closer to Baramula,
seems to rise sheer from the waters of the Wular Lake; on a clear

1 [From Uri to Rampur — Analyst]

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day, far over to the right, the peak of Kolahoi is visible. Here the Valley of Kashmir opens before the road, but since it is on the same level does not appear to be as grand as when one bursts upon it from a high pass.

From the spread town of Baramula, the poplar-lined road goes through the flat fields to Srinagar. Some who go there still prefer to have their houseboat or donga meet them here so that they can continue the journey to the city by water. After that all is so quiet, the road with but few turns or twists; there is little to disturb the stillness except the occasional shout of a shepherd boy; no raging torrent runs below; there are no terrifying corners with honking lorries and hooting cars; no man or beast seems to be in a hurry, for it is the Vale of Kashmir, where nature has its sway. It is as though the unspoken greeting is "here rest a while".

Going out of Kashmir by the other route, a two hundred mile run to Jammu by the Banihal cart road, we left Srinagar at the other side of the city and passing the famous Pampur saffron fields, stopped in the village to buy some of its famed brand of biscuits, then went on past the ruins of the great light grey limestone temple built by King Avanti Varma in the eighth century; this is near to the roadside, surrounded by close-cropped turf, glorious in its broken and aged grandeur, especially in the spring when masses of mauve, wild iris spread around it. We continued on along the raised road through hundreds of acres of rice fields, with hamlets crushing on to the roadway, always seeming to have chosen a blind corner for their site. Tongas and bullock carts held tight to the single width tarred portion of the road and reluctantly gave way to us at the very last minute, to move over on to the dirt-built-up sides. Eventually, after thirty-two miles, we reached Khanabal, which adjoins Islamabad—by some called Anatnag. From here the poplar-lined road turns direct towards the distant mountains; still past fields of corn and rice, past small farms tucked away between willows, past clumps of the always four chinars on the wayside, past Muslim graveyards gay with mauve and white iris, shops which stand close on the edge of the road as if to demand that we stop to buy their wares from the sparsely spread shelves

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I

PROVINCIAL GAZETTEERS OF INDIA

KASHMĪR AND JAMMU

Kashmīr and Jammu.—The territories of the Mahārājā of Kashmīr and Jammu may be roughly described in the words of the treaty of March 16, 1846, as 'situated to the eastward of the river Indus and westward of the river Rāvi.' This country, known to the English as Kashmīr and to the Indians as Jammu, covers an area of 80,900 square miles, extending from 32° 17′ to 36° 58′ N. and from 73° 26′ to 80° 30′ E. It may be likened to a house with many storeys. The door is at Jammu, and the house faces south looking out on the Punjab Districts of Jhelum, Gujrāt, Siālkot, and Gurdāspur. There is just a fringe of level land along the Punjab frontier, bordered by a plinth of low hilly country sparsely wooded, broken, and irregular. This is known as the *Kandi*, the home of the Chibs and the Dogrās. Then comes the first storey, to reach which a range of mountains, 8,000 feet high, must be climbed. This is a temperate country with forests of oak, rhododendron, and chestnut, and higher up of *deodār* and pine, a country of beautiful uplands, such as Bhadarwāh and Kishtwār, drained by the deep gorge of the Chenāb river. The steps of the Himālayan range known as the Pīr Panjāl lead to the second storey, on which rests the exquisite valley of Kashmīr, drained by the Jhelum river. Up steeper flights of the Himālayas we pass to Astor and Baltistān on the north and to Ladākh on the east, a tract drained by the river Indus. In the back premises, far away to the north-west, lies Gilgit, west and north of the Indus, the whole area shadowed by a wall of giant mountains which run east from the Kilik or Mintaka passes of the Hindu Kush, leading to the Pāmirs and the Chinese dominions past Rakaposhi (25,561 feet), along the Muztāgh range past K 2 (Godwin Austen, 28,265 feet), Gasherbrum, and Masherbrum (28,100 and 25,660 feet respectively) to the Karakoram range which merges in the Kuenlun mountains. Westward of the northern angle above

Physical aspects.

131

133

133

Hunza-Nagar the mighty mass of mountains and glaciers trends a little south of east along the Hindu Kush range bordering Chitrál, and so on into the limits of Káfiristán and Afghán territory.

At the Karakoram pass (18,317 feet) the wall zigzags, and to the north-east of the State is a high corner bastion of mountain plains at an elevation of over 17,000 feet, with salt lakes dotted about. Little is known of that bastion; and the administration of Jammu and Kashmír has but scanty information about the eastern wall of the property, which is formed of mountains of an elevation of about 20,000 feet, and crosses lakes, like Pangkong, lying at a height of nearly 14,000 feet. The southern boundary repeats the same features—grand mountains running to peaks of over 20,000 feet; but farther west, where the wall dips down more rapidly to the south, the elevation is easier, and we come to Bhadarwáh (5,427 feet) and to the still easier heights of Basoli (2,170 feet) on the Rávi river. From Mádhopur, the head-works of the Bári Doáb Canal, the Rávi river ceases to be the boundary, and a line crossing the Ujh river and the watershed of the low Dográ hills runs fairly straight to Jammu. A similar line, marked by a double row of trees, runs west from Jammu to the Jhelum river. From the south-west corner of the territories the Jhelum river forms an almost straight boundary on the west as far as its junction with the Kunhár river, 14 miles north of Kohála. At that point the western boundary leaves the river and clings to the mountains, running in a fairly regular line to the grand snow scarp of Nanga Parbat (26,182 feet). Thence it runs almost due north to the crossing of the Indus at Rámghát under the Hattu Pír, then north-west, sweeping in Punial, Yásin, Ghizar, and Koh, the Mehtarjaos or chiefs of which claim the Tangír and Darel country, and linking on to the Hindu Kush and Mustágh ranges which look north to Chinese territory and south to Hunza-Nagar and Gilgit.

It is said of the first Mahárája Guláb Singh, the builder of the edifice just described, that when he surveyed his new purchase, the valley of Kashmír, he grumbled and remarked that one-third of the country was mountains, one-third water, and the remainder alienated to privileged persons. Speaking of the whole of his dominions, he might without exaggeration have described them as nothing but mountains. There are valleys, and occasional oases in the deep cañons of the mighty rivers; but the mountain is the predominating feature and has strongly affected the history, habits, and agriculture of the

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people. Journeying along the haphazard paths which skirt the river banks, till the sheer cliff bars the way, and the track is forced thousands of feet over the mountain-top, one feels like a child wandering in the narrow and tortuous alleys which surround some old cathedral in England.

It is impossible within the limit of this article to deal in detail with the nooks and corners where men live their hard lives and raise their poor crops in the face of extraordinary difficulties. There are interesting tracts like Padar on the southern border, surrounded by perpetual snow, where the edible pine and the *deodār* flourish, and where the sunshine is scant and the snow lies long. It was in Padar that the valuable sapphires were found, pronounced by experts the finest in the world. Further east across the glaciers lies the inaccessible country of Zāskār, said to be rich in copper, where the people and cattle live indoors for six months out of the year, where trees are scarce, and food is scarcer. Zāskār has a fine breed of ponies. Farther east is the lofty Rupshu, the lowest point of which is 13,500 feet; and even at this great height barley ripens, though it often fails in the higher places owing to early snowfall. In Rupshu live the nomad Champas, who are able to work in an air of extraordinary rarity, and complain bitterly of the heat of Leh (11,500 feet).

Everywhere on the mass of mountains are places worthy of mention, but the reader will gain a better idea of the country if he follows one or more of the better-known routes. A typical route will be that along which the troops sometimes march from JAMMU, the winter capital, past the Summer Palace at Srīnagar in Kashmīr to the distant outpost at Gilgit. The traveller will leave the railway terminus on the south bank of the Tāwi, the picturesque river on which Jammu is built. From Jammu (1,200 feet) the road rises gently to Dansāl (1,840 feet), passing through a stony country of low hills covered with acacias, then over steeper hills of grey sandstone where vegetation is very scarce, over the Laru Lari pass (8,200 feet), dropping down again to 5,150 feet and lower still to Rāmban (2,535 feet), where the Chenāb river is crossed, then steadily up till the Banihāl pass (9,230 feet) is gained and the valley of Kashmīr lies below.

So far the country has been broken, and the track devious, with interminable ridges, and for the most part, if we except the vale of the Bichlari, the pine woods of Chineni, and the slopes between Rāmban and Deogol (Banihāl), a mere series of flat uninteresting valleys, unrelieved by forests. It is a

pleasure to pass from the scenery of the outer hills into the green fertile valley of Kashmír—the emerald set in pearls. The valley is surrounded by mountain ranges which rise to a height of 18,000 feet on the north-east, and until the end of May and sometimes by the beginning of October there is a continuous ring of snows around the oval plain. Leaving the Banihál pass—and no experienced traveller cares to linger on that uncertain home of the winds—the track rapidly descends to Verinág (5,000 feet), where a noble spring of deep-blue water issues from the base of a high scarp. This spring may be regarded as the source of Kashmír's great river and waterway, commonly known as the Jehlam, the Hydaspes of the ancients, the Vitastá in Sanskrit, and spoken of by the Kashmíris as the Veth. Fifteen miles north the river becomes navigable; and the traveller, after a march of 110 miles, embarks at Khánabal in a flat-bottomed boat and drops gently down to Srínagar, the capital of Kashmír.

The valley and surrounding hills.

Looking at a map of Kashmír, one sees a white footprint set in a mass of black mountains. This is the celebrated valley, perched securely among the Himálayas at an average height of 6,000 feet above the sea. It is approximately 84 miles in length and 20 to 25 miles in breadth. North, east, and west, range after range of mountains guard the valley from the outer world, while in the south it is cut off from the Panjáb by rocky barriers, 50 to 75 miles in width. The mountain snows feed the river and the streams, and it is calculated that the Jhelum in its course through the valley has a catchment area of nearly 4,000 square miles. The mountains which surround Kashmír are infinitely varied in form and colour. To the north lies a veritable sea of mountains broken into white-crested waves, hastening away in wild confusion to the great promontory of Nanga Parbat (26,182 feet). To the east stands Haramukh (16,903 feet), the grim mountain which guards the valley of the Sind. Farther south is Mahádeo, very sacred to the Hindus, which seems almost to look down upon Srínagar; and south again are the lofty range of Gwásh Brári (17,800 feet) and the peak of Amarnáth (17,321 feet), the mountain of the pilgrims and very beautiful in the evening sun. On the south-west is the Panjál range with peaks of 15,000 feet, over which the old imperial road of the Mughals passes; farther north the great rolling downs of the Tosh Maidán (14,000 feet), over which men travel to the Púnch country; and in the north-west corner rises the Kájinág (12,125 feet), the home of the *markhor*.

On the west, and wherever the mountain-sides are sheltered

PHYSICAL ASPECTS

from the hot breezes of the Punjab plains, which blow across the intervening mountains, there are grand forests of pines and firs. Down the tree-clad slopes dash mountain streams white with foam, gaining in their course through pools of ice purest cobalt. When the great dark forests cease and the brighter woodland begins, the banks of the streams are ablaze with clematis, honeysuckle, jasmine, and wild roses which remind one of exiles. The green smooth turf of the woodland glades is like a well-kept lawn, dotted with clumps of hawthorn and other beautiful trees and bushes. It would be difficult to describe the colours that are seen on the Kashmir mountains. In early morning they are often a delicate semi-transparent violet coloured against a saffron sky, and with light vapours clinging round their crests. The rising sun deepens the shadows, and produces sharp outlines and strong passages of purple and indigo in the deep ravines. Later on it is nearly all blue and lavender, with white snow peaks and ridges under a vertical sun; and as the afternoon wears on these become richer violet and pale brown, gradually changing to rose and pink with yellow or orange snow, till the last rays of the sun have gone, leaving the mountains dyed a ruddy crimson, with the snows showing a pale creamy green by contrast. Looking downward from the mountains the valley in the sunshine has the hues of the opal: the pale ends of the downs, the vivid light greens of the young rice, and the darker shades of the groves of trees relieved by sunlight sheets, glances of water, and soft blue haze give a combination of tints reminding one irresistibly of the changing hues of that gem. It is impossible in the scope of this article to do justice to the beauty and grandeur of the mountains of Kashmir, or to enumerate the lovely glades and forests, visited by so few. Much has been written of the magnificent scenery of the Sind and Liddar valleys, and of the gentler charms of the Lolāb, but the equal beauties of the western side of Kashmir have hardly been described. Few countries can offer anything grander than the deep-green mountain tarn, Kowsarāg, in the Panjāl range, the waters of which make a wild entrance into the valley over the splendid cataract of Arabal, while the rolling grass mountain called Tosh Maidān, the springy downs of Raiyār looking over the Sukhāg river as it twines, foaming down from the mountains, the long winding park known as Yusmarg, and lower down, still the little hills which remind one of Surrey, and Nilnāg with its pretty lake screened by the dense forests, are worthy to be seen.

As one descends the mountains and leaves the woodland

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A view through the mountains and down the valley of Kashmir, showing the cultivated plain, bounded immediately, and right up to the fringe of the forest zone is green and walnut-tree shrouded. A little lower down, at an elevation of about 5,000 feet, rice of a hardy and stunted growth is found, and the shady plane-tree appears. Lower still superior rice are grown, and the watercourses are edged with willows. The side valleys which lead off from the vale of Kashmir, though possessing distinctive charms of their own, have certain features in common. At the mouth of the valley lies the wide delta of fertile soil on which the rice with its varying colours, the plane-trees, mulberries, and willows grow luxuriantly; a little higher up the land is terraced and rice still grows, and the slopes are shaded with the wild indigo, till at about 6,000 feet the plane-tree gives place to the walnut, and rice to millets. On the left bank of the mountain river endless forests stretch from the bottom of the valley to the peaks; and on the right bank, wherever a nook or corner is sheltered from the sun and the hot breezes of India, the pines and firs establish themselves. Further up the valley, the river, already a roaring torrent, becomes a veritable waterfall dashing down between lofty cliffs, whose banks are fringed with maples and horse-chestnuts, white and pink, and millets are replaced by buckwheat and Tibetan barley. Soon after this the useful birch-tree appears, and then come grass and glaciers, the country of the shepherds.

Karewas.

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Where the mountains cease to be steep, fan-like projections with flat arid tops and bare of trees run out towards the valley. These are known as *karewas*. Sometimes they stand up isolated in the middle of the valley, but, whether isolated or attached to the mountains, the *karewas* present the same sterile appearance and often the same abrupt walls to the valley. The *karewas* are pierced by mountain torrents and seamed with ravines. Bearing in mind that Kashmir was once a lake, which dried up when nature afforded an outlet at Bāramūla, it is easy to recognise in the *karewas* the shelving shores of a great inland sea, and to realise that the inhabitants of the old cities, the traces of which can be seen on high bluffs and on the slope of the mountains, had no other choice of sites, since in those days the present fertile valley was buried beneath a waste of water.

Lakes and springs.

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Kashmir abounds in mountain tarns, lovely lakes, and swampy lagoons. Of the lakes the WULAR, the DAL, and the Manasbal are the most beautiful. It is also rich in springs, many of which are thermal. They are useful auxiliaries to the mountain streams in irrigation, and are sometimes the sole

sources of water, as in the case of Achabal, Verinag, and Kokernag on the south, and Argal on the east. Islamabad or Anantnag, 'the place of the countless springs,' stands on numerous streams. One of these springs, the Mallikhag, is sulphurous, and its water is highly prized for garden cultivation. The Kashmiris are good judges of water. They regard Kokernag as the best source of drinking-water, while Chashma Shahi above the Dal Lake stands high in order of merit.

It is time now for the traveller who has been resting in Srinagar to set out on the great northern road which leads to Gilgit. He will have admired the quaint, insanitary city lying along the banks of the Jhelum, with a length of 3 miles and an average breadth of 1½ miles on either side of the river. The houses vary in size from the large and spacious brick palaces of the Pandit aristocrat and his yes-minions, warmed in the winter by *kangris*, to the dirt hovels of three storeys, where the poor shawl-weaver lives his cramped life, and shivers in the frosty weather behind lattice windows covered with paper. In the spring and summer the earthen roofs of the houses, resting on layers of birch-bark, are bright with green herbage and flowers. The canals with their curious stone bridges and shady waterway, and the great river with an average width of eighty yards, spanned by wooden bridges, crowded with boats of every description, and lined by bathing ghats, are well worth studying. The wooden bridges are cheap, effective, and picturesque, and their construction is ingenious, for in design they appear to have anticipated the modern cantilever principle. Old boats filled with stones were sunk at the sites chosen for pier foundations. Piles were then driven and more boats were sunk. When a height above the low-water level was reached, wooden trestles of *double* logs were constructed by placing rough-hewn logs at right angles. As the structure approached the requisite elevation to admit of *shahtirah* (house-boats) passing beneath, *double* logs were cantilevered. This reduced the span, and huge trees were made to serve as girders to support the roadway. The foundations of loose stones and piles have been protected on the upstream side by planking, and a rough but effective cut-water made. The secret of the stability of these old bridges may, perhaps, be attributed to the skeleton piers offering little or no resistance to the large volume of water brought down at flood-time. It is true that the heavy floods of 1893 swept away six out of the seven city bridges, and that the cumbrous piers tend to narrow the waterway, but it should be remembered

that the old bridges had sanctioned many a serious flood. Not long ago two of the bridges, the Hakim Kadal and the Zaina Kadal, had rows of shops on them reminding one of Old London Bridge, but these have now been cleared away.

Srinagar to Gilgit.

The distance by road from Srinagar to Gilgit is 216 miles, and the traveller can reach Bandipore at the head of the Wular Lake by boat or by land. The Gilgit road, which uses the Kashmir State, in the first instance, 13 lakhs, is a remarkable achievement, and was one of the greatest boons ever conferred on the Kashmiri subjects of the Maharaja. Previous to its construction supplies for the Gilgit garrison were carried by impressed labourers, many of whom perished on the passes, or returned crippled and ruined by frost-bite on the snow or accident on the goat paths that did duty for roads. The journey to Gilgit before 1890 has been aptly compared with the journey to Siberia. Now, supplies are carried on ponies and the name Gilgit is no longer a terror to the people of Kashmir.

From Bandipore a steep ascent leads to the Raj Dihngan pass (11,800 feet), a most dreaded place in the winter months, when the cold winds mean death to man and beast. Thence through a beautifully wooded and watered country, past the lovely valley of Gurais, down which the Kishanganga flows, the traveller has no difficulties till he reaches the Burzil pass (13,500 feet), below which the summer road to Skardu across the dreary wastes of the Deosai plains branches off to the north-east. This is a very easy pass in summer, but is very dangerous in a snowstorm or high wind.

Descending from the Burzil the whole scene changes. The forests and vegetation of Kashmir are left behind, the trees are few and of a strange appearance, and the very flowers look foreign. It is a bleak and rugged country, and when Astor (7,853 feet) is left the sense of desolation increases. Nothing can be more dreary than the steep descent from Doian down the side of the arid Hatto Pir into the sterile waste of the Indus valley. It is cool at Doian (8,730 feet); it is stifling at Rāmghāt (5,800 feet), where one passes over the Astor river by a suspension bridge. The old construction was a veritable bridge of sighs to the Kashmir convicts who were forced across the river and left to their fate—starvation or capture by the slave-hunters from Chilās. A little cultivation at Bunji relieves the eye; but there is nothing to cheer the traveller until the Indus has been crossed by a fine bridge, and 30 miles farther the pleasant oasis of Gilgit is reached.

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The Indus valley is a barren desolate country. The very river with its black water looks lost, and the great mountains are destitute of vegetation. The only thing of beauty is the view of the snowy ranges, and Nanga Parbat in the rising sun seen from the crossing of the Indus river to Gilgit sweeps into oblivion the dreadful desert of sands and rock. Gilgit (4,890 feet) itself is fertile and well watered. The mountains fall back from the river, and leave room for cultivation on the alluvial land bordering the right bank of the Gilgit river, a rare feature in the northern parts of the Maharaja's dominions.

Another route giving a general idea of the country runs from west to east, from Kohála on the Jhelum to Leh, about 5 miles beyond the Indus. A good road from Rawalpindi brings the traveller to Kohála, where he crosses the Jhelum by a bridge, and enters the territories of Jammu and Kashmir. The cart-road passes from Kohála to Srinagar, a distance of 130 miles, by easy gradients. As far as Baramúla the road is close to the river, but for the most part at a great height above it, and the scenery is beautiful. At Muzaffarábád the Kishanganga river joins the Jhelum, and here the road from Abbottábád and Garhi Habib-ullah connects with the Kashmir route. The road runs along the left bank of the Jhelum, through careful terraced cultivation, above which are pine forests and pastures. It carries a very heavy traffic, but owing to the formation of the country it is liable to constant breaches, and is expensive to keep in repair.

Kohála to Leh.

From Uri a road runs south to the country of the Rája of Punch, the chief feudatory of the Mahárája, crossing the Hájí pass (8,500 feet). At Baramúla the road enters the valley of Kashmir, and runs through a continuous avenue of poplars to Srinagar. In bygone days this route, known as the Jhelum valley road—now the chief means of communication with India—was little used. The Rambán and Khakhás, who still hold the country, were a restless and warlike people; and the numerous forts that command the narrow valley suggest that the neighbourhood was unsafe for the ordinary traveller. The construction of the road from Kohála to Baramúla cost the State nearly 20 lakhs.

From Srinagar to Leh is 243 miles. The first part of the journey runs up the Sind valley, perhaps the most exquisite scenery in Kashmir. Fitful efforts are made from time to time to improve this important route, but it still remains a mere fair-weather track. The Sind river thunders down the

valley, and the steep mountains rise on either side, the northern slopes covered with pine forest, the southern bare and treeless. At Gagangir the track climbs along the river current to Sonamarg (8,650 feet), the last and highest village in the Sind valley, if we except the small hamlet of Nilagrar some 2 miles higher up. Sonamarg is a beautiful mountain meadow surrounded by glaciers and forests. It is a miserable place in the winter time, but it is of great importance to encourage a resident population. The chief staples of cultivation are *grain*, or Tibetan barley, and buckwheat. It is good to turn loose the baggage ponies to graze on the meadow grasses; for in a few more marches one passes into a region like the country beyond the Burzil on the road to Gilgit, a land devoid of forests and pastures, 'a desert of bare crags and granite dust, a cloudless region always burning or freezing under the clear blue sky.' The Zoji La (11,300 feet) is the lowest depression in the great Western Himálayas which run from the Indus valley on the Chilás frontier. Over this high range the rains from the south hardly penetrate, and the cultivation, scanty and difficult, depends entirely on artificial canals. The ascent to the Zoji La from Kashmír is very steep, the descent to the elevated table-land of Tibet almost imperceptible. For five marches the route follows the course of the Drás river, through a desolate country of piled up rocks and loose gravel. At Chanagund the road to Skárdu crosses the Drás river by a cantilever bridge, 4 miles above the junction of the Drás and Suru rivers, and about 8 miles farther on the Indus receives their waters. But the steep cliffs of the Indus offer no path to the traveller, and the track leaves the Drás river, and turns in a southerly direction to Kargil, a delightful oasis. Then the road abandons the valleys and ascends the bare mountains. The dreary scenery is compensated by the cloudless pale blue sky and the dry bracing air so characteristic of Ladákh. Through gorges and defiles the valley of Shergol is reached, the first Buddhist village on the road. Thenceforward the country is Buddhist, and the road runs up and down over the Namika La (13,000 feet) and over the Fotu La (13,400 feet), the highest point on the Leh road. Along the road near the villages are Buddhist monasteries, *mani* (walls of praying stones) and *chaitas*, where the ashes of the dead mixed with clay and moulded into a little idol are placed, and at Lamayaru there is a wilderness of monuments. Later, the Indus is crossed by a long cantilever bridge; and the road runs along the right

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land through the fertile oasis of Khalsi, then through the usual desert with an occasional patch of vegetation to Leh (11,500 feet), the capital of Western Tibet and of Western Buddhism, and the trade terminus for caravans from India and from Central Asia. It is a long and difficult road from Leh to Yārkand, 480 miles, over the Khardung La, the Saser La, and the Karakoram pass of between 17,000 and 19,000 feet altitude, where the useful yak (*Bos grunniens*) relieves the ponies of their loads when fresh snow has fallen, or serves unladen to consolidate a path for the ponies.

Leh to Astor.

A brief description may be given of one more of the many routes that follow the rivers and climb the mountains—the route from Leh through Baltistān to Astor on the Gilgit road. At Khalsi, where the Srinagar-Leh road crosses the Indus, the track keeps to the right bank of the Indus, and passing down the deep gorge of the river comes to a point where the stupendous cliffs and the roaring torrent prevent further progress. There the traveller strikes away from the Indus and ascends the mountains to the Chorbat pass (16,700 feet), covered with snow even in July. From the pass, across the valley of the Shyok river, the great Karakoram range, some 30 miles away, comes into view. An abrupt descent carries the traveller from winter into hot summer; and by a difficult track which in places is carried along the face of the cliff by frail scaffolding (*pare*), following the course of the Shyok river, smoothly flowing between white sands of granite, and passing many pleasant oases, one comes to the grateful garden of Khapalu, a paradise to the simple Baltis. Crossing the united waters of the Shyok and the Indus on a small skin raft, the traveller arrives at Skārdu (7,050 feet), the old capital of Baltistān. Here the mountains on either side of the Indus recede, and the sandy basin, about 5 miles in breadth, is partially irrigated by water from the pretty mountain lake of Satpara and carefully cultivated. Looking across the Indus to the north, the Shigar valley, the garden of Baltistān, with its wealth of fruit trees is seen. There the cultivator adds to his resources by washing gold from the sands of the river. From Skārdu the direct route to Gilgit follows the Indus, which is crossed at Rondu by a rope bridge so long as to be most trying to the nerves, but a fair-weather track over the Banak pass lands the traveller on the Gilgit road at Astor.

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It is difficult to give a general idea of a country so diversified as Kashmīr and Jammu. As will be seen in the section on history, a strange destiny has brought people of distinct races,

• 133 languages, and religions, and countries of widely different physical characteristics, under the rule of the Maharája.

Mountain and river systems.

The Kashmír territory may be divided physically into two areas: the north-eastern, comprising the area drained by the Indus with its tributaries; and the south-western, including the country drained by the Jhelum with its tributary the Kishanganga, and by the Chenáb. The dividing line or watershed is formed by the great central mountain range which runs from Nanga Parbat, overhanging the Indus on the north-west, in a south-easterly direction for about 240 miles till it enters British territory in Láhul.

South-western area.

The south-western area may, following the nomenclature of Mr. Drew, in its turn be geographically divided into three sections: the region of the outer hills, the middle mountains, and the Kashmír Valley.

Outer hills.

Approaching Kashmír from the plains of the Punjab, the boundary is not at the foot of the hills, but embraces a strip of the great plains from 5 to 15 miles wide, reaching from the Ravi to the Jhelum. As is generally the case along the foot of the Western Himálayas, this tract of flat country is somewhat arid and considerably cut up by ravines which carry off the flood-water of the monsoon. A fair amount of cultivation is found on the plateaux between these ravines, though, being entirely dependent on the rainfall, the yield is somewhat precarious. The height of this tract may be taken at from 1,100 to 1,200 feet above sea-level.

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Passing over the plain a region of broken ground and low hills is reached, running mainly in ridges parallel to the general line of the Himálayan chain. These vary in height from 2,000 to 4,000 feet, and are largely composed of sandstone, being in fact a continuation of the Siwálik geological formation. Lying between these parallel ridges are a series of valleys or *dúns*, fairly well populated, in the east by Dográs, and in the west by Chibs. These hills are sparsely covered with low scrub bushes, the *chír* (*Pinus longifolia*) gradually predominating as the inner hills are reached. Beyond these lower hills rise the spurs of a more mountainous district.

The middle mountains.

The scope of this region, as defined by Mr. Drew, has been somewhat extended, and includes the range which forms the southern boundary of the Kashmír Valley, known as the Panjál range, and its continuation eastwards beyond the Chenáb. This tract is about 180 miles long and varies in width from 25 to 35 miles. The portion lying between the Jhelum and Chenáb is formed by the mass of mountainous spurs running

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down from the high Panjāl range which forms its northern limit. The Panjāl itself, extending from Muzaffarābād on the Jhelum to near Kishtwār on the Chenāb, is a massive mountain range, the highest central portion to which the name is really applied having a length of 80 miles, with peaks rising to 14,000 and 15,000 feet. From the southern side a series of spurs branch out, which break up the ground into an intricate mountain mass cut into by ravines or divided by narrow valleys.

The elevation of these middle mountains is sufficient to give a thoroughly temperate character to the vegetation. Forests of Himālayan oak, pine, spruce, silver fir, and *deodār* occupy a great part of the mountain slopes; the rest, the more sunny parts, where forest trees do not flourish, is, except where rocks jut out, well covered with herbage, with plants and flowers that resemble those of Central or Southern Europe. East of the Chenāb rises a somewhat similar mass of hills, forming the district of Bhadarwāh, with peaks varying from 9,000 to 14,000 feet in height. These culminate in the high range which forms the Chamba and Rāvi watershed in Chamba territory.

Kashmir Valley.

The third section of the south-western area bears a unique character in the Himālayas, consisting of an open valley of considerable extent lying completely surrounded by mountains. The boundaries are formed on the north-east by the great central range which separates the Jhelum and Indus drainage, and on the south by the Panjāl range already described. The eastern boundary is formed by a high spur of the main range, which branching off at about 75° 30′ E. runs nearly due south, its peaks maintaining an elevation of from 12,000 to 14,000 feet. This minor range forms the watershed between the Jhelum and Chenāb, separating the Kashmīr from the Wardwān valley. It eventually joins and blends with the Panjāl range about 16 miles west of Kishtwār. On the north and west, the bounding ranges of the valley are more difficult to describe. A few miles west of the spot from which the eastern boundary spur branches near the Zoji La, another minor range is given off. This runs nearly due west for about 100 miles at an elevation of from 12,000 to 13,000 feet, with a width of from 15 to 20 miles. It forms the watershed between the Jhelum on the south and its important tributary the Kishanganga on the north. After reaching 74° 15′ E. the ridge gradually curves round to the south, until it reaches the Jhelum abreast of the western end of the Panjāl range. The valley thus enclosed

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has a length, measured from ridge to ridge, of about 115 miles with a width varying from 45 to 70 miles, and is drained throughout by the Jhelum with its various tributaries. The flat portion is much restricted, owing to the spurs given off by the great central range, which run down into the plain, forming the well-known Lolab and Lidhar valleys. On the southern side the spurs from the Panjál range project 10 to 16 miles into the plain.

North-Western Region.

The north-western section is comprised between the great central chain on the south and the Karakoram range and its continuation on the north. It is drained by the Indus and its great tributaries, the Shyok, the Shakti, the Suru, and the Gilgit rivers. The chief characteristic of this region, more especially of the eastern portion, is the great altitude of the valleys and plains. The junction of the Gilgit and Indus rivers is 4,500 feet above sea-level. Proceeding upstream, 80 miles farther east at the confluence of the Shyok and Indus, the level of the latter is 7,500 feet; opposite Leh, 150 miles farther up the river, its height is 10,600 feet, while near the Kashmir-Tibet boundary in the Kokshung district the river runs at the great height of 13,800 feet above sea-level.

Between the various streams which drain the country rise ranges of mountains, those in the central portions attaining an elevation of 16,000 to 20,000 feet, while the mighty flanking masses of the Karakoram culminate in the great peak Godwin Austen (28,265 feet). The difference of the level in the valleys between the eastern and western tracts has its natural effect on the scenery. In the east, as in the Rupshu district of Ladákh, the lowest ground is 13,500 feet above the sea, while the mountains run very evenly to a height of 20,000 or 21,000 feet. The result is a series of long open valleys, bounded by comparatively low hills having very little of the characteristics of what is generally termed a mountainous country. To the west as the valleys deepen, while the bordering mountains keep at much the same elevation, the character of the country changes, and assumes the more familiar Himálayan character of massive ridges and spurs falling steeply into the deep valleys between.

Central chain.

The central chain commences in the west at the great mountain mass rising directly above the Indus, of which the culminating peak is Nanga Parbat. From this point it runs in a south-easterly direction, forming the watershed between the Indus and the Kishanganga. It quickly falls to an altitude of 14,000 to 15,000 feet, at which it continues for 50 or 60 miles. It is crossed by several passes, the best known of which are

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the Burzil on the road from Kashmir to Gilgit, and the Zoji La of 11,300 feet, over which runs the road from Srinagar to Dras and Leh. From the Zoji La the mountains rapidly rise in elevation, the peaks attaining an altitude of 18,000 to 20,000 feet, culminating in the Nun Kun peaks which rise to a height of over 23,000 feet. Owing to their altitude these mountains are under perpetual snow, and glaciers form in every valley. The range keeps this character throughout Kashmir territory for a distance of 150 miles to the Bilut Likha (pass), where it passes into Ilgit.

Karakoram chain.

The Karakoram range is of a far more complicated character. Broadly speaking, it is a continuation of the Hindu Kush, and forms the watershed between the Central Asian drainage and the streams flowing into the Indian Ocean. From its main ridge lofty spurs extend into Kashmir, separating the various tributaries of the Indus, the result being a stupendous mountain mass 200 miles long, with a width on the south side of the watershed of 50 to 60 miles, with peaks averaging from 21,000 to 23,000 feet, culminating on the west in the well-known Rakaposhi mountain, north of Gilgit, over 25,500 feet high, and in the mighty group of peaks round the head of the Baltoro glacier dominated by the second highest mountain in the world, Godwin Austen, whose summit is 28,265 feet above the sea. The head of every valley is the birthplace of a glacier. Many of these are of immense size, such as the Baltoro, the Biafo, and Hispar glaciers, the two latter forming an unbroken stretch of ice over 50 miles long. This great mountain barrier is broken through at one point by the Hunza stream, a tributary of the Gilgit river, the watershed at the head of which has the comparatively low elevation of about 15,500 feet. The next well-known pass lies 150 miles to the east, where the road from Leh to Yārkand leads over the Karakoram pass at an altitude of about 18,300 feet.

A description of this mountainous region would be incomplete without a reference to the vast elevated plains of Lingzhithang, which lie at the extreme north-eastern limit of Kashmīr territory. These plains are geographically allied to the great Tibetan plateau. The ground-level is from 16,000 to 17,000 feet above the sea, and such rain as falls drains into a series of salt lakes. Of vegetation there is little or none, the country being a desolate expanse of earth and rock. The northern border of this plateau is formed by the Kuenlun mountains, the northern face of which slopes down into the plains of Khotan.

Geology.

An account of geology will be found in the memoir by

• 133 Mr Richard Lydekker, *The Geology of the Kashmir and Chamba Territories and the British District of Khagan*. Mr. Lydekker differs from Mr. Drew, also an expert in geology, who held that some of the gravels at Bhramtila were of glacial origin, indicating the existence of glaciers in the valley at a level of 5,000 feet; but he has no doubts as to their existence on the Pir Panjál range and in the neighbourhood of the various *margs* or mountain meadows which surround the valley. The question of the glaciation and the evidences of relative changes of level within a geologically recent period is fully discussed for the Sind valley by R. D. Oldham in *Records, Geological Survey of India*, vol. xxxii, part 2.

There is abundant evidence that igneous or volcanic agencies were actively at work, as is proved by the outpouring of vast quantities of volcanic rocks; but these are not known to have been erupted since the Eocene period. Subterranean thermal action is, however, indicated by the prevalence of numerous hot springs. The burning fields at Soiyam, of which an account is given by Lawrence, *Valley of Kashmir*, pp. 42–3, point to the same conclusion, and the frequency of earthquakes suggests subterranean instability in this area.

The following table of geological systems in descending order is given by Mr. Lydekker for the whole State :—

	European equivalents
Alluvial system:	
Low-level alluvia, &c.	Prehistoric.
High-level alluvia, glacial, lacustrine, and Karewa series	Pleistocene.
Tertiary system:	
Siwálik series — Outer	Pliocene.
Siwálik series — Inner	Pliocene.
Sirmúr series — Murree group	Miocene.
Sirmúr series — Subáthu group	Eocene.
Sirmúr series — Indus Tertiaries	Eocene.
Zánskár system:	
Chíkkim series	Cretaceous.
Supra-Kuling series	Jura and Trias.
Kuling series	Carboniferous.
Panjál system:	
Not generally subdivided	Silurian. Cambrian.
Metamorphic system:	
Metamorphosed Panjáls, &c.	Palæozoic and Archæan.
Central gneiss	Palæozoic and Archæan.

Under the first of these systems, Mr. Lydekker has discussed

the interesting question, whether Kashmir was once covered by a great lake. In this discussion the *karewa* already described plays an important part, and the only explanation of the upper *karewas* is that Kashmir was formerly occupied by a vast lake of which the existing lakes are remnants. Mr. Drew estimated that at one period this lake must have reached a level of nearly 2,000 feet above the present height of the valley, but this estimate is considered far too high by Mr. Lydekker. No very satisfactory conclusions can be drawn at present as to the barrier which dammed the old lake, or as to the relative period of its existence.

A full account of the flora of Kashmir is given by Lawrence, *Valley of Kashmir*, chap. iv. The valley has an enormous variety of plants, and the Kashmiri finds a use for most of them. Among condiments the most important is the *ate zīrā* (*Carum sp.*), or carraway. Under drugs, *Cannabis sativa*, the hemp plant, and *Artemisia* or *tetwan* may be mentioned. Asafœtida is found in the Aster *tukri*. Numerous plants yield dyes and tans, of which *Datisca cannabina*, *Rubia cordifolia*, and *Geranium sylvaticum* are the most familiar. Kashmir is rich in fibres, and the people make great use of them. The two best are the *Abutilon Avicennae* and the *Cannabis sativa*. *Burza* (*Betula utilis*), the paper birch, is a most important tree to the natives. The bark is employed for various purposes, such as roofs of houses, writing paper, and packing paper. Many of the ancient manuscripts are written on birch bark. The Kashmiri neglects nothing which can be eaten as fodder. The willow, the Indian chestnut, the cotoneaster, the hawthorn, and the poplar are always lopped to provide fodder for cattle and sheep in the winter.

Excellent grasses abound, and the swamps yield most nutritious reeds and other plants. There is an abundance of food-plants, too numerous to be enumerated here. *Euryale ferox*, *Nymphaea stellata*, *N. alba*, *Nelumbium speciosum*, the exquisite pink water-lily, *Acorus Calamus*, and *Typha sp.*, the reed mace, all contribute to the Kashmiri's sustenance. Wild fruits are in profusion, and many fungi are eaten by the people. The mushroom is common, and the *morel* (*Morchella sp.*) abounds in the mountains and forms an important export to India. There are plants that are useful for hair-washes, and the herbs with medicinal properties are almost innumerable. *Macrotomia Benthami* is one of these peculiarly esteemed by the Kashmiris as a remedy for heart-affections. Among the scents may be noted *Gogal dhup* (*Jurinea macrocephala*), which

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obtainable importance for cultivation in the valley. From June to November heavy rain falls on the Pir Panjāl range, and in Jammu chiefly in the months of July, August, and September. The rainfall at Jammu and Pūnch is comparable with that of the submontane Districts of the Punjab. It is more moderate in amount in the valley, which receives a total of 32·4 inches, as compared with 39·7 inches at Pūnch and 26·8 inches at Dras. The precipitation is very light to the east of the first line of the snows bordering the valley on the east, and is about 6 inches in total amount at Gilgit, Skārdo, Kargil, and Leh. Thus the south-west monsoon is the predominant feature in Jammu and Kishtwār, while in Ladākh, Gilgit, and the higher ranges the cold-season precipitation is more important. The tables on p. 82 show the average temperature and rainfall at Srīnagar and Leh for a series of years ending with 1903.

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Earthquakes are not uncommon, and eleven accompanied by loss of life have been recorded since the fifteenth century. In 1885 shocks were felt from the end of May till the middle of August, and about 3,500 people were killed. Fissures opened in the earth, and landslips occurred. Floods are also frequently mentioned in the histories of the country, the greatest following the obstruction of the Jhelum by the fall of a mountain in A.D. 879. The great flood of 1841 in the Indus caused much loss of life and damage to property. In 1893 very serious floods took place in the Jhelum owing to continuous rain for 52 hours, and much damage was done to Srīnagar. An inundation of a yet more serious character occurred in 1903.

Earthquakes and floods.

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The early history of Kashmīr has been preserved in the celebrated *Rājataraṅgiṇī*, by the poet Kalhaṇa, who began to write in 1148. He gives a connected account of the history of the valley, which may be accepted as a trustworthy record from the middle of the ninth century onwards. Kalhaṇa's work was continued by Jonarāja, who brought the history through the troubled times of the last Hindu dynasties, and the first Muhammadan rulers, to the time of the great Zain-ul-ābidīn, who ascended the throne in 1420. Another Sanskrit chronicler, Śrīvara, carries on the narrative to the accession of Fateh Shāh in 1486; and the last of the chronicles, the *Rājavalīpatāka*, brings the record down to 1586, when the valley was conquered by Akbar.

History. Sources.

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The current legend in Kashmīr relates that the valley was once covered by the waters of a mighty lake, on which the

Legends.

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Bhānds or Bhagats, already referred to. Sometimes we find in the villages a wandering minstrel (Bain), who sings to the accompaniment of a guitar, or recites verses, often extempore, full of local allusions and usually full of flattery, if an official or person of influence be present. Like most Orientals, the Kashmīris regard amusement as passive rather than active. They are glad to look on at a race or a game, but it is extremely difficult to induce them, athletic and powerful as they are, to take a part in any sport. They are not altogether to blame. In former days pastime was at a discount, and small mercy would have been shown to the serf who suggested that life should not be all labour. Even in the pampered city of Srīnagar the effervescence of youth was checked by Gulāb Singh, who sternly repressed the old ward fights with slings and stones. The professional *shikāris* are often keen sportsmen; and the boatmen of Kashmīr will, when challenged, paddle till they drop rather than be beaten by a rival crew.

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Agriculture. Jammu.

As already explained, the Jammu province consists of a fringe of level land bordering on the Punjab Districts of Jhelum, Sialkot, and Gurdāspur, gradually rising by a succession of ranges of hills to the high uplands bounded by the mountains of the Himālayan range, across which lie Kashmīr, Baltistān, and Ladākh. The variations of climate are great, and the staples cultivated naturally vary to some extent with the climate. Thus the lower tracts yield all the usual crops of the Punjab, while in the higher tracts saffron, buckwheat, and mountain barley are grown. In the warmer parts the mango and *shīsham* are found in large quantities; but these give place to apple and pear-trees, to the picturesque *deodār* and shady Oriental plane (*chinār*) in the colder parts.

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Plains and lower hills.

The province may be roughly divided into three main divisions. The plains and *kandi* hills consist of the *tahsīls* of Kathua, Jasmirgarh, Samba, Ranbīrsinghpura, Jammu, Akhnūr, Manawar, and Mīrpur. In the hot moist tracts, such as those irrigated from the Rāvi and Ujh in the Jasrota district to the south-west, sickness is so rampant that the resident population is too small for the cultivation of the soil, which is chiefly tilled by *udarach* cultivators, men from the low hills who descend to the plain for short periods to sow, tend, and reap crops, and return again to their healthier homes.

North of this lie the thirsty lowlands, sheltered by the hills from the cooler inland breezes, seamed with many channels (*khadds*), which carry off the drainage of the uplands and become

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roaring torrents for a few hours after heavy rainfall, but at other times are broad stretches of burning sand. This tract depends for a full crop on timely and well-distributed rainfall.

The parched *kandi* hills are composed of a red loam, thickly strewn with round stones and covered with stunted growth of *garna sanatan* and *kahaikar* bushes, broad-leaved species of trees, acacias, and in parts bamboos. The *tor* (*Euphorbia*) is used to hedge the fields and cobble-paved paths, and to keep the *stigai* from damaging the crops. The soil is thirsty and dries quickly, as the land slopes and drainage is rapid. Frequent rainfall is necessary to ripen the crops, chiefly wheat, barley, and *sarshaf* (rape) in the spring, and millet and maize (on manured land) in the autumn; but rain washes away the soft earth and leaves the surface of the soil a mass of stones.

Where the *kandi* hills end, and before the first limestone ridge is crossed, there is a narrow belt of cool land lying in the valleys traversed by the clear streams which carry the drainage of the middle hills on the lower side. When the depth of soil is sufficient, excellent crops are raised and much of the land is irrigated; but on the slopes where the depth of earth is small, and the limestone crops up to the surface (*grál*), cultivation is precarious. Too much rain causes the soil to become water-logged, as percolation is stopped by the rock bed; and during a continued spell of hot weather the rock surface becomes so heated as to burn the roots of the crops, which wither.

Irrigation.

In this portion of the province wells are few, owing to their cost. Except in the lowland bordering on the streams deep boring is necessary, and it is common to find that the water is from 70 to 100 feet below the surface. The cultivators are not as a rule sufficiently well-to-do to undertake the expenditure necessary to sink such wells, and risk the failure of finding water. Since the introduction of the regular settlement, the Darbár has done much to encourage the sinking of wells by the grant of advances on easy terms.

In this tract, however, are found the only considerable areas protected by irrigation. The natural difficulties to be overcome are great, as the lie of the land makes projects costly and difficult to execute. The lines of irrigation have to cross the drainage of the country, and it is not easy to secure the channels against damage from the *kadis* when in flood. Owing to this difficulty, the more ambitious projects of former days—the Kashmír canal taking off from the Rávi above the

[For the province of Jammu ... Analysis]

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Mādhopur weir, the Shāhi Nahr taking off from the left bank of the Chenāb opposite Akhnūr, and the Katobandi or Dalpat Nahr taking off from the Chenāb on the right bank—failed to render permanent help to the country. Something has recently been done to remedy the apathy displayed in the past. Two old irrigation works taking off from the Tāwi in the Jammu *taksil*—the Jogi Darwāza canal irrigating the land immediately below Jammu city, and the Satwari canal irrigating the villages round Satwari cantonment—have been realigned and put in order; and the Dalpat canal, taking off from the right bank of the Chenāb and irrigating a large portion of the Akhnūr *taksil* lying immediately north of the Bhajwath Andar, has been reconstructed.

Under agreement with the Government of the Punjab the right of the State to take water from the Rāvi, above the Mādhopur weir, for the irrigation of spring crops in the Kathua *taksil* has been surrendered in consideration of an annual payment of Rs. 5,000. The restoration of the old Kashmīr canal, which takes off above the weir, is thus not financially attractive. Probably the low-lying portion of the Mīrpur *taksil*, known as the Khari Ilāka, could be irrigated from the Jhelum; but this source of irrigation has not been tapped.

Hindrances to cultivation.

There are many drawbacks to agriculture. The administration in the past was bad and shortsighted. There are practically no roads, and in the *kandi* tract even drinking-water is obtained with difficulty. Much damage is done by *nilgai*, hog, and monkeys, the first-named animal, though an antelope, being regarded as sacred like the cow. Cattle turned loose, either as likely to die and of no further use, or devoted to the deity, have become quite wild and do much damage to crops.

Intermediate band.

Above the first limestone range lies a country of wide valleys and high hills, consisting of Basoli, Rāmnagar, Udhampur, Naoshera, and part of Rāsi. This has a more temperate climate than the tract just described. The supply of water by perennial streams is constant, but the stream beds are deep and irrigation is not easily effected. Being nearer the Himālayan range, rainfall is usually heavy and fairly constant, so that the people do not trouble themselves much about irrigation, except where this can be contrived at little expense. The crops are much the same as in the plains, but *bājra* gives way to maize, and sugar-cane and turmeric disappear. The seasons are shorter. The areas of *karēti* land, where the limestone bed penetrates or approaches the surface of the soil, are con-

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siderable. Communications are backward and prices generally rule low. Trade is carried on by Telis, who keep droves of pack-bullocks or ponies. Grazing is good and the tract is frequented by Gūjars, goatherds, and shepherds. A considerable export of *ghī* takes place. Wild hog and monkeys do damage, but no antelope are found. Autumnal fevers are very rare.

Uplands.

The higher uplands, including Bhadrāwar, Kishtwār, Rāmbān, part of Riāsi, and Rāmpur Rājaori, have a really cold climate, and in the winter snow falls. The cultivators are a different class from those in the plains and lower hills, and Kashmīri settlers are found. Here the mango-tree gives place to the apple; and the pear, the Oriental plane (*chinār*), and the *deodār* are found. The climate approximates to that of the valley of Kashmīr, and cultivation is on much the same lines. The specialities are saffron in Kishtwār, and poppy in Dodār, Kishtwār, and Bhadrāwar. This tract is healthy, and only in the more shut-in valleys do fevers trouble the people. Irrigation is general and the rainfall heavy. Grazing lands are plentiful and Gūjars numerous. Early snowfall and cold winds from the mountains affect the crops in the parts adjoining the Himālayan range, and prevent these coming to maturity in certain years. Bears, hog, and monkeys do some damage.

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Kashmīr proper.

Owing to its system of rivers, Kashmīr proper possesses a large area of alluvial soil, which may be divided into two classes: the new alluvial, found in the bays and deltas of the mountain rivers; and the old alluvial, lying above the banks of the Jhelum and extending as far as the *karewa*. The first is of great fertility, and every year is renewed and enriched by silt from the mountain streams. Up to the present, in spite of the lax system of forest conservancy, the silt of the mountain streams is rich and of dark colour; but the Sind river brings down an increasing amount of sandy deposit, which is partly due to the reckless felling of trees in its valley.

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Soils.

The Kashmīris, so far, have considered no crop worthy of attention save rice; by irrigation and manuring an artificial mould has been obtained for the rice-fields, and it is rare to hear anything said about the original soil. But they recognize four classes which require peculiar treatment when under rice-cultivation. These are known as *grūtū*, *bakil*, *sekil*, and *dasanlad*. *Grūtū* soil contains a large proportion of clay. It holds water, and in years of scanty rainfall is the safest land for rice. But if the rains be heavy, the soil cakes and the outturn of rice is poor. *Bakil* is a rich loam of great natural

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Indus (Sanskrit, *Sindhu*; Greek, *Sinthos*; Latin, *Sindus*).—The great river of North-western India, which rises in Tibet, and then flows through Kashmīr, the North-West Frontier Province, and the Punjab, and after a final course through Sind falls into the Arabian Sea in 23° 58′ N. and 67° 30′ E. The drainage basin of the Indus is estimated at 372,700 square miles, and its total length at a little over 1,800 miles. The towns of importance on or near its banks in British territory are, beginning from the south: Karāchi, Kotri, Hyderābād, Sehwān, Sukkur, Rohri, Mithankot, Dera Ghāzi Khān, Dera Ismail Khān, Miānwāli, Kālābāgh, Khushālgarh, and Attock.

Course in Tibet and Kashmīr.

The first section of the course of the Indus lies outside British territory, and must be briefly dealt with here. The river rises, as above stated, in Tibet (32° N. and 81° E.), behind the great mountain wall of the Himālayas, which forms the northern boundary of India; it is said to spring from the north side of the sacred Kailās mountain (22,000 feet), the Elysium of ancient Sanskrit literature. Issuing from the ring of lofty mountains about Lake Mānasarowar, where also the Sutlej, the Brahmaputra, and the Kauriālā have their rise, it flows north-west for about 160 miles under the name of Singh-kā-bāb, until it receives the Ghar river on its south-western bank. A short distance below the junction of the Ghar, the river, which is supposed to have an elevation of 17,000 feet at its source, enters the south-eastern corner of Kashmīr at an elevation of 13,800 feet, flowing slowly over a long flat of alluvium. Following a steady north-by-west course, it skirts Leh at a height of 10,500 feet and drops to 8,000 feet in Baltistān, just before it receives the waters of the Shyok river. At Leh it is joined by the Zāskār river, and is crossed by the great trade route into Central Asia via the Karakoram Pass. Early travellers, like Dr. Thomson and Mr. Blane, have described this portion of the Indus. The former found numerous hot springs, some of them with a temperature of 174° and exhaling a sulphurous gas. Still flowing north, but more westerly, through Kashmīr territory, it passes near Skārdu in Baltistān, and reaches the Haramosh mountain (24,300 feet) in about 34° 50′ N. and 74° 30′ E. Here it takes a turn southwards at an acute angle, and passing beneath the Hattu Pīr, at an elevation of 4,000 feet, enters Kohistān in the Dīr, Swāt, and Chitrāl Agency near Gur. The steepness of its fall varies, now becoming greater, now less. This inequality of slope has been connected with the changes that occurred in the glacial period from the damming of the river

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by great glaciers and the formation of great thicknesses of lacustrine deposit. The Indus has been the cause of serious and disastrous floods; the rapid stream dashes down gorges and wild mountain valleys, and in its lower and more level course it is swept by terrific blasts. Even in summer, when it is said to dwindle down to a fordable depth during the night, it may during the course of the day swell into an impassable torrent from the melting of the snows on the adjoining heights. Opposite Skārdo in Baltistān it is, even in the depth of winter, a grand stream, often more than 500 feet wide and 9 or 10 feet in depth. After leaving Gur, it flows for about 120 miles south-west through the wilds of Ḳohistān, until it enters the North-West Frontier Province (35° 25′ N. and 73° 51′ E.), near Darband, at the western base of the Mahāban mountain. The only point to which special allusion can be made in the long section of its course beyond British territory is the wonderful gorge by which the river bursts through the western ranges of the Himālayas. This gorge is near Skārdo, and is said to be 14,000 feet in sheer descent.

In the Frontier Province and the Punjab.

The Indus, on entering the Hazāra District of the North-West Frontier Province, 812 miles from its source, is about 100 yards wide in August, navigable by rafts, but of no great depth, and studded with sandbanks and islands. It is fordable in many places during the cold season; but floods or freshes are sudden, and Ranjīt Singh is said to have lost a force, variously stated at from 1,200 to 7,000 horsemen, in crossing the river. Even the large and solid ferry-boats which ply upon it are sometimes swept away. Almost opposite Attock it receives the KĀBUL river, which brings down the waters of Afghānistān. The two rivers have about an equal volume, both are very swift, and broken up with rocks. Their junction during floods is the scene of a wild confusion of waters. The Kābul river is navigable for about 40 miles above the confluence, but a rapid just above it renders the Indus impracticable. Attock, the limit of the upward navigation, forms the first important point on the river within British territory. By this time it has flowed upwards of 860 miles, or nearly one-half of its total length, its further course to the sea being about 940 miles. It has fallen from its elevation of 17,000 feet at its source in Tibet to about 2,000 feet, the height of Attock being 2,079 feet. In the hot season, opposite the fort, its velocity is 13 miles an hour; and in the cold season, 5 to 7 miles. The rise of ordinary floods is from 5 to 7 feet in twenty-four hours only, and the maximum is 50

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feet above cold-season level. Its width varies greatly with the season—at one time being more than 250 yards, at another less than 100. The Indus is crossed at Attock by the railway bridge opened in 1883, a bridge of boats, and a ferry. The main trunk road to Peshāwar also crosses the river by a subway on the railway bridge.

After leaving Attock, the Indus flows almost due south, forming the western boundary of the Punjab, parallel to the Sulaimān Hills. The great north road from Sind to Bannu runs for several hundred miles parallel with its western bank; and from Mahmūd Kot to Attock the Sind-Sāgar, Māri, and Māri-Attock branches of the North-Western Railway run along its eastern bank. Twelve miles below Attock the Indus receives the waters of the Haroh, a rapid stream which, rising in the Murree hills as the Dhānd, meets the Karrāl coming down from the Mochpuri peak, and rushes through steep banks for a total course of 90 miles. At Makhad, the Sohān brings in all the drainage of Rāwalpindi and Jhelum Districts that is not taken by the Jhelum river. The Indus forms the eastern border of the two frontier Districts of Dera Ismail Khān in the North-West Frontier Province and Dera Ghāzi Khān in the Punjab, with the Sind-Sāgar Doāb on its eastern bank, and only a narrow strip of British territory between it and the hill tribes of the Sulaimān ranges on the west. Just above Mithankot, in the south of Dera Ghāzi Khān District, it receives the accumulated waters of the Punjab. Between the Indus and the JUMNA flow the five great streams from which the Punjab (Panj-āb, literally 'The five waters') takes its name. These are the JHELUM, the CHENĀB, the RĀVI, the BEĀS, and the SUTLEJ. After various junctions these unite to form the PANJNAD river, literally 'The five streams,' which marks for a short space the boundary between British territory and the Bahāwalpur State, and unites with the Indus near Mithankot, about 490 miles from the sea. In the cold season the breadth of the Indus above the confluence is about 600 yards, its velocity 5 miles an hour, its depth from 12 to 15 feet, and its estimated discharge 10,000 to 25,000 cubic feet per second. During flood-times the breadth sometimes increases to 5 miles, and the discharge to 1,000,000 cubic feet per second. The dimensions of the Panjnad above the point of junction are somewhat less than those of the Indus during the cold season, but during the monsoon floods they are almost as large as the Indus. The whole course of the Indus through the Punjab is broken by islands and sandbanks, but beautiful

3: Imperial Gazetteer G-3 (1889-95) 1909 AV1 Kashmir AV1

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scenery is afforded along its banks, which abound with the date, acacia, pomegranate, and other trees.

In Sind.

Mithankot has an elevation of only 258 feet above the level of the sea. From Mithankot the Indus forms the boundary between the Punjab and the Bahāwalpur State, until, near Kashmor, it enters Sind in 28° 26′ N. and 69° 47′ E. From Bukkur (in Sind) to the sea the river is known familiarly among the Sindīs as the 'Daryā' (the river). Pliny writes of *Indus incolis Sindus appellatus*. It first touches Sind close to Kashmor town in the Upper Sind Frontier District, separating it from the Bahāwalpur State and Sukkur District. Formerly in years of high inundation its floods reached Jacobābād, finding their way thence into the Manchhar Lake. To prevent this, the Kashmor embankment, which is the largest in Sind, was erected. Leaving Kashmor the river crosses Sukkur District, divides Lārkāna and Karāchi from the Khairpur State and Hyderābād District, finally emptying itself by many mouths into the Arabian Sea near Karāchi, after a south-western course of 450 miles through Sind. It ranges in width from 480 to 1,600 yards, the average during the low season being 680 yards. During the floods it is in places more than a mile wide. Its depth varies from 4 to 24 feet. The water, derived from the snows of the Himālayas, is of a dirty brown colour, and slightly charged with saline ingredients, carbonate of soda, and nitrate of potash. Its velocity in the freshes averages 8 miles per hour, at ordinary times 4 miles. The discharge per second varies between a minimum of 19,000 and a maximum of 820,000 cubic feet. On an average the temperature of the water is 10° lower than that of the air. Near the station of Sukkur and again at Kotri the river is spanned by a fine railway bridge. The Sukkur bridge was opened in 1889, and resembles the Forth Bridge in having a central girder with a span of 200 feet, supported at the ends of two cantilever arms, each 310 feet long. The Indus begins to rise in March, attains its maximum depth and width in August, and subsides in September. The maximum rise registered at Kotri, near Hyderābād, was 22 feet 7 inches in 1894. There are many other gauges on the river.

The Indus delta.

The delta of the Indus covers an area of about 3,000 square miles, and extends along the coast-line for 125 miles. It is almost a perfect level, and nearly destitute of timber, the tamarisk and mangrove alone supplying fuel. In these respects the delta is similar to that of the Nile, but dissimilar from the Ganges delta. The marshy portions contain good

pasturage, and rice grows luxuriantly wherever cultivation is possible; but the soil generally is not fertile, being a mixture of sand and clay. In the Shāhbandar *tāluka* are immense deposits of salt. The climate of the delta is cool and bracing in the winter months, hot in the summer, and during the floods most unhealthy.

Jhelum (*Jehlam*).—River in Kashmīr and the Punjab, being the most westerly of the five rivers from which the Punjab derives its name. It was known to the Muhammadan historians as the Bihat, Wihat or Bihatab, corruptions of its Sanskrit name *Vitastā* (which Alexander's historians graecized into *Hydaspes*, but Ptolemy more correctly as *Bidaspes*), while its modern Kashmīri name is *Veth*. It may be said to have its source in a noble spring of deep-blue water, which issues from the bottom of a high scarp of a mountain spur. The spring is known as Vernāg; and at Khānabal, 15 miles north, its waters join the streams of Adpat, Bring, and Sandran, and form the starting-point of navigation. The river is navigable without a single lock from Khānabal to Bāramūla, 102 miles. In its course to the Wular Lake, which may be regarded as a delta of the river, the fall is 165 feet in the first 30 miles and 55 feet in the next 24 miles. From the Wular Lake to Bāramūla the fall is very slight.

The Jhelum river has many tributaries. On its right bank it receives the Liddar or Lambodri, which comes down from the everlasting snows overhanging the head of the Liddar valley, and from the mountain lake of Tarsar. Below Srīnagar at Shādīpur—the place of the marriage of the two rivers—the Sind river joins the Jhelum; and beyond the Wular Lake the Pohru stream, which drains the Lolāb valley, merges in the great river. On the left bank the chief tributaries are the Vishav, the Rembiara, the Ramshi, the Dudgangā, the Suknāg, and the Ferozepura. The Dudgangā joins the Jhelum at the lower end of Srīnagar city.

Below Bāramūla (5,000 feet) the placid Jhelum leaves the fertile banks of the valley, and rushes headlong down a deep gorge between lofty mountains of the Kazināg range on the north and an extension of the Pīr Panjāl on the south to Kohāla, 2,000 feet. At Muzaffarābād the Kishangangā river joins the Jhelum on its right bank, while a few miles lower down, and on the same side, the Kunhār river, which drains the Hazāra country, adds no inconsiderable volume of water. Between Khānabal and Bāramūla there are many bridges, but between Bāramūla and Domel, where the Kishangangā river

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joins the Jhelum, the bridges are scarce and primitive. Much of the internal commerce of Kashmīr depends on the Jhelum. An account of the various descriptions of boats used will be found in the article on SRĪNAGAR.

Below its junction with the Kishangangā the Jhelum forms the boundary between the Kashmīr State and the British Districts of Hazāra and Rāwalpindi, flowing in a narrow rocky bed, shut in by mountains on either side. Numerous rapids here render navigation impossible, though large quantities of timber are floated down from Kashmīr. A handsome suspension bridge at Kohāla, in Rāwalpindi District, connects Kashmīr with British territory. Below Dangalli, 40 miles east of Rāwalpindi, the Jhelum becomes navigable. Passing into Jhelum District, it skirts the outlying spurs of the Salt Range, receiving the waters of the Kahan, and finally debouches upon the plains a little above the town of Jhelum, about 250 miles from its source. Below Jhelum, inundation of the lowlands begins to be possible, and sandy islands stud the wide bed of the stream. The Bunhā, in the rains a roaring torrent which sometimes spreads over a mile of country, joins the Jhelum at Dārāpur. After a south-westerly course of more than 100 miles, during which the river divides the District of Jhelum from Gujrāt and Shāhpur, it enters the latter District entirely, and trends thenceforth more directly southward. The width in this portion of its course averages 800 yards in flood, dwindling during the winter months to less than half that size. Sudden freshes occur after heavy rains, and cause frequent inundations over the lowlands, greatly increasing the productive power of the soil. The Jhelum next enters the District of Jhang, where it preserves the same general characteristics, but with a wider valley, bounded by the high uplands known as the Bār. It finally joins the Chenāb at Trimmu, in 31° 11′ N. and 72° 12′ E., 10 miles to the south of Maghiāna, after a total course of not less than 450 miles, of which about 200 lie within British territory. The current in the plains has an average rate of 4 miles per hour. The wedge of land between the Jhelum and the Chenāb is known as the Chaj Doāb; while the tract stretching westward to the Indus bears the name of the Sind Sāgar Doāb.

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The principal towns upon the Jhelum are Kashmīr or Srīnagar, Jhelum, Pind Dādan Khān, Miāni, Bhera, and Khushāb. According to General Cunningham, the point where Alexander crossed the Hydaspes may be identified with Jalālpur in Jhelum District; while nearly opposite, on the

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Gujrāt bank, stands the modern battle-field of Chiliānwāla. Other writers hold that the passage was effected near Jhelum town. A bridge of boats crosses the river at Khushāb. The permanent railway bridge of the North-Western Railway also crosses it at the town of Jhelum, and the Sind Sāgar line at Haranpur. The LOWER JHELUM CANAL takes off at Mong Rasūl in Gujrāt District.

Chenāb (the *Acesines* of the Greeks and *Asikni* of the Vedas).—River in Kashmīr and the Punjab, being one of the five streams from which the latter Province derives its name. It rises in the Himālayan canton of Lāhul in the Punjab in two streams: the Chandra which issues from a large snow-bed on the south-east side of the Bāra Lācha at a height of 16,221 feet, and the Bhāga which rises on the north-west slopes of the pass. The Chandra, after flowing south-east for 55 miles, sweeps round the base of the mid-Himālayas and joins the Bhāga at Tandi, after a total course of 115 miles. The course of the Bhāga to Tandi is only 65 miles, its average fall being 125 feet per mile. The united stream, now known as the Chandra-Bhāga or Chenāb, flows through the Pāngi valley in the Chamba State and then enters the Padar district of Kashmīr at an elevation of 6,000 feet. Thence for 180 miles it flows between steep cliffs of the high mountains, and then for 25 miles through the lower hills to Akhnūr, where it becomes navigable. There are three remarkable bends in the Chenāb. Where it reaches Kishtwār from a north-west course it suddenly twists due south; at Jangalwār it tacks from south to west; and at Arnas it leaves its westerly course and flows due south past Riāsi to Akhnūr. At each of these turns the Chenāb is joined by streams of considerable size, and at every change of course the river seems to cut through the mountain range along which it had been flowing.

The chief tributaries in its passage through Kishtwār, Bhadrawār, and Jammu are the Uniar and Shudi, and the Bhutna and Māru Wardwan rivers. Between Kishtwār and Akhnūr it receives the waters of the Golan Lar and Lidar Kol, and the Bichlari and Ans, and between Riāsi and the western boundary of Jammu it is joined by the Tāwi. There are several bridges, two of which on the routes from Jammu to Kashmīr, and from Kashmīr to Kishtwār respectively, are of a superior description. The rest are of the primitive *jhūla* type—three ropes stretched across the stream in the form of a triangle.

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The Chenāb re-enters the Punjab at Khairi Rihāl in Siālkot

3: Imperial Gazetteer G-3 (1889-95) 1909 AV1 Kashmir AV1
Kashmīri AV4

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District. The Tāwi joins it almost at once, and the first place of importance in British territory is Wazīrābād, where the Alexandra Bridge carries the North-Western Railway across the river. Throughout its course in the plains the river flows in a wide and shifting bed of sand. A few miles south-west of Wazīrābād the main branch of the Lower Chenāb Canal takes off at Khānki; and thence the river flows on greatly diminished in bulk, dividing the Chaj Doāb on the west from the Rechna Doāb on the east until the Jhelum joins it in Jhang District at Trimmu. Thence the two rivers flow under the name of the Chenāb, till joined by the Rāvi near Sidhu and the Sutlej at Madwāla. The North-Western Railway crosses it again at Sher Shāh. Thence the united stream flows on under the name of the Panjnad, to join the Indus at Mithankot. Small boats can navigate the Chenāb in the plains all the year round, but there is little traffic above Chiniot.

There is evidence to show that the Chenāb flowed to the east of Multān as late as A. D. 1245. The Beās then occupied its old bed passing Dipālpur; and the Jhelum, Chenāb, and Rāvi met north-east of Multān, and flowing to the east of that town joined the Beās 28 miles south of it and east of Uch. Thus Multān and Uch both lay in the Sind-Sāgar Doāb. By 1397 the Chenāb had altered its course westward and was flowing to the west of Multān, as it still does. The part of the river which divides the modern District of Gujrāt from Gujrānwāla was known to the Muhammadan historians as the Sūdharā (SODHRA), from the town of that name on its left bank.

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Wular Lake.—Lake in Kashmīr State, lying between 34° 16′ and 34° 26′ N. and 74° 33′ and 74° 42′ E., at an elevation of 5,180 feet above sea-level. The lake has an area of 12½ square miles, but in years of flood, such as 1893, it may cover 103 square miles. The Wular has a bad reputation among the boatmen of Kashmīr; for when the winds come down the mountain gorges, the quiet surface of the lake changes into a sea of rolling waves, most dangerous to the flat-bottomed craft of the country. The name is supposed to be a corruption of *Ullola*, Sanskrit for 'turbulent' or '[the lake] with high, going water.' The ancient name is Mahāpadmasaras, derived from the Nāga Mahāpadma, who is located in the lake as its tutelary deity. The Bohnar, Madmati, and Erin streams flow into the lake from the high amphitheatre of mountains on the north, while from the south the Jhelum enters through marshes and peaty meadows. In the north-east corner is an island made by king Zain-ul-ābidīn as a storm refuge for boats, and on the

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western shore is the scarp of Watlab on which stands the celebrated shrine of Shukr-ud-din. The chief products of the lake are fish, wild-fowl, and the singhara nut.

Dal Lake. --Lake in Kashmir State, situated close to Srinagar, measuring about 4 miles by 2 1/2 and one of the most beautiful spots in the world. The mountain ridges, which are reflected in its waters as in a mirror, are grand and varied, the trees and vegetation on the shores of the Dal being of exquisite beauty. In the spring the fresh green tints of the trees and the mountain sides are refreshing to the eye, but it is perhaps in October that the colours of the lake are most charming. The willows change from green to silver grey and delicate russet, with a red tone on the stems and branches, casting colours on the clear water of the lake, which contrast most beautifully with the rich olives and yellow greens of the floating masses of water-weed. The chinars are warm with crimson, and the poplars stand up like golden poles to the sky. On the mountain sides the trees are red and gold, and the scene is one of unequalled loveliness. Looking towards the city from the lake the famous hill, the Takht-i-Sulaiman, stands on the left; and to the right the hill of Hari Parbat, with its picturesque fort full of recollections of the grandeur of past times. Between these hills lies Srinagar, and away to the west are the snow-capped mountains of Kashmir. The Dal is clear, and the people say that the shawls of Kashmir owed much of their excellence to being washed in its soft waters. Nature has done much for the lake, but the Mughal emperors exerted themselves to enhance its natural beauties; and though the terraced gardens of Jahangir and Shah Jahan, with the prim rows of cypress through which formal cascades tumble down to the edge of the Dal, may not please the European landscape-gardener, the magnificent plane-trees which the great Mughals bequeathed to posterity have added a distinctive charm. The park of plane-trees known as the Nasim Bagh, 'the garden of breezes,' which was planted in Akbar's time, is the most beautiful of all. Nothing is perhaps more striking than the ruined Pari Mahal standing grandly on a spur of the Zebanwan mountains, which was built by Dara Shikoh for his tutor, Mulla Shah, whose tomb is at Mulshahi Bagh, near the entrance of the Sind valley. There are two small islands on the lake, known as the Sona Lanka or 'golden isle' and the Rupa Lanka or 'silver isle.' The original of the name Dal is uncertain. One authority states that the name signifies in the Kashmiri language 'lake,' and that there is a Tibetan word Dal which means 'still.' In the chronicle of Srtvara the lake is called Dala. The cultivation on the lake is peculiar and interesting.

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4: Durand G-3 (1888-93) 1900 AV1 Kashmir AV1

one companion for a length of time. For four months we lived alone together, sharing the pleasures and troubles of hard travelling, and we emerged from the trial the fastest friends. With such a companion, delighting in the people, the scenery, and the novelty of the life, the four months of marching was a continual pleasure.

From Rawal Pindi, where the rail is left, the road into Kashmir runs for forty miles uphill to Murree, the summer headquarters of the Punjab Military Command, and from there descends twenty-eight miles to Kohala, in the valley of the Jhelum, which river is here the boundary between British India and Kashmir. The Jhelum is crossed by a suspension bridge at Kohala, and from this point the road runs for over ninety miles along the left bank of the river till it debouches at Baramulla into the main valley of Kashmir, within a few miles of the spot where the river leaves the Woollar Lake. The road is a very fine one, admirably aligned, but at the time I write of it was only partially completed, and we had to march about half the distance between Kohala and Baramulla, at which place the traveller into Kashmir usually enters the boats that convey him to Srinagar, the capital of the Kashmir State.

In the summer the heat in the Jhelum valley is very great, and though the scenery is fine, the river in a constantly recurring series of rapids cutting its way through the gorges of the impeding hills, there is not anything as a rule of remarkable beauty, and one's only object is to get through the journey as quickly as possible. The last few marches, however, are striking. The road runs below great cliffs

4: Durand G-3 (1888-93) 1900 AV1 Kashmir AV1

clothed with forest, at one time through the terraced fields of rich rice cultivation, at another through thickets of lilac, barberry, and hazel, and at another through the forest itself, here composed of magnificent deodars. Ruins of Buddhist temples by the roadside—some of them of great interest, and in a fair state of preservation—bear witness here, as do other remains on every well-known natural line of communication throughout the Hindu-Kush and Northern India, to the widespread power of the creed once ruling from Kandahar and Kabul to Bengal, of which now, throughout the continent of India, scarcely a trace remains, except in time-worn stones.

The valley of Kashmir, which is about eighty miles long by twenty broad, contains and leads to some of the most beautiful scenery in the world. Shut in by a great circle of snowy mountains, traversed by a fine river running through richly cultivated lands, adorned by a chain of lovely lakes, watered by a thousand streams, covered with numerous villages embowered in every species of fruit-tree, with lake and stream bordered by plane-trees, the magnificent "chenar," dear to the Mogul Emperors, and planted by them wherever they loved to dwell, the vale of Kashmir is, outwardly at least, the earthly paradise of the East.

The traveller generally leaves Baramulla in the evening, and his barge is paddled and towed up by sunset to a spot where boats tie up for the night. From this point, at early dawn, a start is made to cross the Woollar Lake. This great stretch of water has an evil name among the boatmen, for it is subject to swift and terrible storms, against which the keel-

4: Durand G-3 (1888-93) 1900 AV1 Kashmir AV1

less boats, with their heavy top hamper of mat roofs, cannot possibly make head. It is an unpleasant experience to be caught in a storm on the lake. All that is feasible in this case is to drift with the wind, paddling as rapidly as possible towards the nearest reed bed, and to tie up there till the storm is past; but many a boat caught in the open lake has been swamped, and the boatmen are full of tales of shipwreck. By starting before sunrise it is possible, however, to cross by mid-day to the other side of the lake, where the river flows into it, and storms as a rule do not come down till after-noon.

The scene as your boat steals out into the lake an hour or more before sunrise is one never to be forgotten; many a time did I get up to enjoy it, and each time new beauties revealed themselves. It always reminded me of a picture of the Dutch School in varying gradations of pearly greys. The night has passed, and the cold, clear light of dawn steals over every feature of the scenery. The great snow mountains stand out white and pure against the cloudless sky, in which the morning star still burns; not a touch of pink has yet warmed their silent summits. Reed beds, swathed in gently-moving mist, and long grassy promontories, on which stand motionless cattle, project into the lake in ever-varying outline as the boat glides on, all showing grey in the yet sunless light. The weird call of the water-pheasant sounds on all sides, as the black and white birds, disturbed by the sound of the paddles, wheel over the marshes; and for miles around you stretches the great expanse of water, cool and grey, swept here and there with washes of pale blue, or dark-blue greys where the lake shallows.

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133 The journey up the river, though it offers many
137 beautiful views, is monotonous, and it is a relief to get out of your boat occasionally and to walk along the bank ahead of the men towing, or to cut off bends of the river by striking across country. In the spring the banks of the Jhelum are bordered for miles by broad bands of purple iris, with an occasional mass of the white iris showing the village graveyard; the air is delightful, and breathes new life into any one who has come up from the burning plains of India. When tired of walking there is nearly always a clump of the great plane-trees, or a single one growing on the river bank, to give the wayfarer pleasant shade, where he can sit and wait for his boat, sung into day-dreams of home in the far West by a chorus of sky-larks.

361 Srinagar itself is picturesque as approached by boat. The town, a huddled mass of lightly-built houses, in the construction of which timber takes a prominent part, lines both banks of the river. It is dominated by two isolated hills, one crowned with the battlements of the State prison and fortress called Hari Parbet, the other the Takht-i-Suleiman, or Throne of Solomon, topped by an ancient temple which has looked down on the crowded life below for many centuries, for it was built before the secret of the true arch was known. Behind these hills rise the rugged outlines of the mountains which form the boundary of
[491] the valley. As your boat ascends the stream it passes under bridge after bridge of wood built out from massive wooden piers on timber cantilevers, and the bank is lined with temples, whose roofs, covered with tin, shine like silver. Ruined quays, retaining

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000 At Bandipur we were met by two officials of the Kashmir State, who had been deputed to accompany me—the one with strict injunctions never to lose sight of me for a moment wherever I might go, the other with orders to see me as far as Gilgit. A guard of twenty Kashmir sepoys, Dogras of one of the best regiments, had also been told off as my escort. I had, in addition, four Pathan orderlies belonging to my regiment, the Central India Horse. They were picked men of tried gallantry, true as steel, worthy of the implicit trust I placed in them. The baggage of the party was carried by coolies, the roads not being suitable for animal transport.

787 The second of the Kashmir officers was a charming companion, a Hindoo gentleman of the old school, who had passed much of his life at the Kashmir Court. Bright, always cheerful, with a supreme contempt for the savage people among whom we were to spend our time, and also it must be allowed for the beauties of their wild country, he invariably saw the amusing side of life, and was ready to extract some fun out of the difficulties and mishaps of frontier travel. We became the greatest friends, and spent hours in endless talk. The last time I saw him his humour was a trifle gruesome. He came to take leave of me, and told me with much glee how the Brahmin astrologer whom he had consulted about his return to Kashmir had fixed the lucky day for his start, but had not been able to foresee his own departure on a longer journey. The unfortunate man had died of cholera that morning.

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● 133 From Bandipur the road runs straight out of the 137 valley over the Tragbal pass, the highest point of

4: Durand G-3 (1888-93) 1900 AV1 Kashmir AV I

which is about twelve thousand feet. Our first camp was at an altitude of over nine thousand feet in a glade in the pine forest, the turf covered with blue forget-me-nots. The march up was lovely, through one succession of copses of jasmine and scented wild rose, the latter of all colours from white to dark red. Close to the camp we came on the first signs of the army which had preceded us—a line of graves of men who had died of cholera. The troops and coolies were said to have suffered much from this scourge, and we arranged to avoid their camping grounds in future. The following morning we continued our march, the road winding up through pine forest till the rounded tops of the watershed were reached. We halted for an hour at the top, surrounded by a wilderness of flowers, blue gentian, anemones, acres of white and yellow blossoms bordering the wreaths of snow, masses of small pink alpine flowers, wild rhubarb and sorrel in profusion, and patches of dwarf juniper, for we were well above the pine and birches. The views from here are lovely—to the left, steep pine-clad slopes descend into the famed Lolab valley, behind, stretched out thousands of feet below, lie the valley of Kashmir and the blue sheet of the Woollar Lake, backed by the snowy range of the Pir Panjal; to the right stand the great square peak and snow-fields of Haramukh; in front, a hundred miles away, towers Nanga Parbat, from which on both hands as far as the eye can reach tossed ranges patched with snow fill up the picture.

I had an example on reaching camp this day of the extraordinary carrying power of the Kashmiri coolie; my tent was late coming up, and when it

4: Durand G-3 (1888-93) 1900 AV1 Kashmir AV1

were lent to the Durbar for this purpose by Government. The villagers are no longer liable to be dragged out for forced labour if they do not satisfy the extortionate demands of tax collectors and plundering officials. But it will take many a long year before the Kashmiri becomes a man.

The next few marches are up the valley of the Kishengunga, one of the most beautiful in Kashmir. The road runs for the most part near the river, through fir forest and thickets of deciduous trees and bushes, amongst which the white Persian lilac and wild roses show in great profusion. At the lower end of the valley is a splendid grove of branching poplars, beyond which, near Gurais, are a few miles of open cultivation and stretches of meadow land. The steep hill sides for the most part, however, close in on the river; the slopes facing north covered with forest, those facing south bare of trees but grass grown, as is usual in the Himalayas, where the summer sun burns up the southern exposed slopes too much to permit of young woods growing. The mountains rise in grand peaks, broken into precipices hung with fir and birch, and interspersed with alpine meadows.

The height of the Gurais valley is about eight thousand feet, and the climate as near perfection in spring, summer, and autumn as can be found on earth. We habitually marched early for the sake of the coolies, starting any time after four or five, stopping to breakfast at some tempting spot, where we would spend most of the day reading or wandering off the road in search of views and game, and finally reaching camp some time in the afternoon. It was the existence of the nomad, the charm of which once tasted

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wild flowers delighted and astonished afresh. I had a busy time for a couple of months here, getting into touch with the Kashmir officials, and making preparations for my summer march, and for my permanent establishment at Gilgit. The latter was no easy matter, considering that Rawal Pindi, the nearest railway station, was separated by four hundred miles from Gilgit, and that for most of that distance there was but a goat track for a road.

My instructions were that, the moment the sanction of the Secretary of State was received to the proposals of Government, I was to proceed to Gilgit, re-establish the Agency there, visit Hunza and Nagar, and then march to Chitral. If feasible, I was to extend my march, and visit the Khans of Dir and Umra Khan of Jandol. I meant to have another try at the road from Chitral to Peshawar, but again I was to be disappointed, and it was not till six years later that I was to traverse it, after the road had been opened by the force which relieved the beleaguered garrison of Chitral.

A still further vision now came to haunt and disturb me, the reported existence of a pass called the Saltoro, which was said to cross the Mustagh range north-east of Skardu in Baltistan, and to give access to the Shimshal valley, and so to Hunza from the north. I knew all about Younghusband's horrible experience in crossing the Mustagh at the end of his great journey across China, and that the road he followed, formerly a well-used one to Yarkand, was completely blocked by glaciers. But rumours were persistent that there was a practicable pass, though its existence was always openly

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A HAND BOOK

OF

JAMMU AND KASHMIR STATE.

CHAPTER I.—PHYSICAL & POLITICAL GEOGRAPHY.

101 131 **Area.**—The total area of Jammu and Kashmir State is 84,471 square miles. It lies between 32°-17′ and 36°-58′ North Latitude and 73°-26′ and 80°-30′ East Longitude and is the largest State in India. It is larger than Hyderabad, about as large as Mysore, Bikaner, Gwalior and Baroda put together, and two-thirds the size of the whole of the Bombay Presidency.

Boundaries.—On the north it is bounded by Chinese and Russian Turkistan, on the east by Chinese Tibet, on the south by the Punjab and on the west by the North-Western Frontier Province. The territories of three powers, *viz.*, Britain, China and Russia, and of the independent kingdom of Afghanistan meet on the northern borders of the State.

133 **Physical features.**—In addition to a small strip of land along the borders of Jammu, which is a continuation of the great plain of the Punjab, and a bleak tract adjoining the Karakorum Mountains, the territories of His Highness the Maharaja Bahadur of Jammu and Kashmir include valleys formed by the Chenab and the Jhelum and the middle reaches of the Indus.

Geographical divisions.—The generally accepted geographical divisions of the territories are as follows:—

1. The Sub-montane and Semi-mountainous Tract, consisting of the plain contiguous to the Punjab and broken *kandi* country skirting the Himalayan ranges. The rivers Ravi, Chenab and Jhelum and several perennial streams flow through the southern plain area, which borders upon several Punjab districts. Rice, wheat, maize and other crops are grown in this area. Canals drawn from the big rivers and small village streams are the main sources of irrigation. The northern portion of the region called

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133 [240] [162] *kandi* has an altitude of 2,000 feet or less. Its soil is stony and sandy and cultivation depends mainly on seasonal rainfall. The area of this division is 2,609 square miles. The population at the census of 1941 was 8,14,028.

2. The Outer Hills, consisting of the comparatively low hills to the south of the mountain ranges. This division comprises the whole area covered by the ranges of low hills to the south of the Pir Panjal mountains, which divide the two provinces of Jammu and Kashmir, one from the other. The altitude of the greater part of this belt varies from 2,000 to 4,000 feet, though the hills in Bhadarwah reach heights of over 5,000 feet. On the lower levels, and stretched between the hills are patches of cultivated lands or stunted forests. The higher elevations [241] are covered with pine and *deodar* forests. The cultivation is greatly helped by the proximity of the Pir Panjal mountains, whose tremendous altitude causes the moisture-bearing winds to deposit most of their aqueous vapours in this part of the country. Rice and wheat are grown in some parts, while maize is the staple food. The area of [163] this division is 9,769 square miles; the population at the census of 1941 was 11,67,405.

3. The Jhelum Valley, consisting of the valleys that drain into the Jhelum and the Kishanganga rivers. The mountains enclosing this tract have an average altitude of 12,000 feet. Many of the peaks exceed 14,000 feet. Water for irrigation is supplied by the perennial streams which have their sources in the surrounding snow-clad mountains. The Jhelum valley situated at over 5,000 feet above the sea level, and the beautiful lateral valleys of the Sindh, and the Liddar (the three together forming the famous Kashmir Valley) and the hilly tract of Muzaf- [241] farabad are included in this division. The Kashmir valley is fertile and yields abundant harvests of rice. Fruits of various kinds are produced. Wheat and maize are grown. In Muzaffarabad district, agriculture is precarious and the cultivated area is small. The area [162] of the division is 8,539 square miles; the population at the census of 1941 was 17,28,705.

4. The Tibetan and Semi-Tibetan Tract, consisting of the middle reaches of the Indus. The river has its source in Lake Manasarovar in Tibet and traverses the whole of the division running from south-east up to the

133 bend round Nanga Parbat, where it assumes a south-westerly course. The mountains in the north stretch up to the Pamirs, and reach great heights ; one of the peaks, Mt. Godwin Austin 28,250 feet above the sea level, is [136] the second highest peak in the world. The Himalayan ranges north and south of the Indus have been described as the " Sportsman's Paradise ", where ibex, *markhor*, and ovis ammon, besides other big game, are met with. A number of mountaineering expeditions have been to these regions for exploration. Except in Gilgit, the ranges in this division vary from 17,000 feet to 22,000 [241] feet. The cultivable area in the Ladakh district is very small and the rainfall deficient, and agriculture is carried on by artificial irrigation. *Grim* (a kind of wheat) is the chief crop and is grown even at a height of 15,000 feet. The small tract of Gilgit enjoys good climate and cultivation, and produces wheat and other crops and fruits. The [162] area of the whole division is 63,554 square miles. The population is very sparse—the density at the census of 1941 was 5 persons to a square mile and the total population 3,11,478.

The first two of these divisions form the province of Jammu, the third is Kashmir proper, while the fourth comprises the district of Gilgit and the Frontier *illaqas* of Skardu, Ladakh, and Kargil.

132 **Climate.**—The climatic conditions of the country vary from the arctic cold of the Ladakh district to the extreme heat of the Punjab plains.

In the sub-montane and semi-mountainous tract of Jammu Province, tropical heat is experienced. Kashmir enjoys a temperate climate in summer, but is very cold in winter. In the Frontier district, especially in Dras, Zanskar and Rupshu, there prevails extreme cold. The deep narrow valleys between Kashmir and Gilgit are hot and damp. Kishtwar and Bhadarwah have a more salubrious climate.

Rainfall is scanty in the Frontier *illaqas* and the Gilgit district, but in the rest of the State it varies from 30 to 65 inches a year. Reasi and Poonch receive more than 60 inches each annually. The annual rainfall of the Jammu district is nearly 45 inches and that of Kashmir Valley varies from 30 to 35 inches.

Places of interest.—(A) The following are some of the

367 its beautiful cascades and fountains was laid out by Jahangir. There is a Trout Hatchery at Achhabal, which is fed by the water of the spring. Outside the garden, there is a small beautiful ground shaded with *chinar* trees. There is also a rest-house, with catering arrangements, situated quite close to the ground.

Vernag.—Another Mughal garden is at Vernag below the beautiful spring there. The place is fifty miles from Srinagar and 6,100 feet above the sea level. It is situated at the foot of the Pir Panjal and has a large spring in an octagonal basin and an arcade built by Jahangir. The [133] limpid water flowing from the spring is one of the principal sources of the river Jhelum.

(3) Hill Stations.

361 485 133 [490] **Pahalgam.**—This hill station is situated at a distance of 59 miles from Srinagar at an altitude of about 7,000 feet above the sea level, in the heart of the finest side valley of Kashmir, the Liddar Valley. The road to Pahalgam from Srinagar is suitable for motor and lorry traffic during the spring, summer and autumn months. It attracts an increasing number of visitors every summer. It has hotels, post and telegraph offices, a Tehsil office, a dispensary, a police station and a conservancy staff. It is an important stage in the pilgrimage to the sacred cave of Sri Amarnath, which is 27 miles away. The great Kolahoi glacier, another attraction for visitors, is about 22 miles from Pahalgam.

Kokarnag.—Kokarnag which is at a distance of 50 miles from Srinagar and 10 miles from Achhabal has a group of springs from which ice-cold water flows. The camping ground is close to the springs. A cafe has recently been opened there.

Gulmarg.—This far-famed holiday resort is about twenty-eight miles from Srinagar, and 8,700 feet above the sea level. It provides many amenities for visitors. It has a high class hotel, post and telegraph offices, a dispensary, a police station and a Tehsil office. The hill station is placed under a Town Area Committee. A magnificent panorama is unfolded to the view from the circular road, 7 miles long, which commands a view of the Nanga Parbat ranges and the whole of Kashmir Valley. Khilanmarg, which is a favourite place for excursions

from Gulmarg, affords a glorious view of Kashmir Valley and its surrounding mountain ranges including Nanga Parbat. It is 1,600 feet higher than Gulmarg and can be reached by a rough pony track through forest area. Towering over Khilanmarg is Affarwat, 14,000 feet above the sea level. It has a picturesque blue lake. One can ride to Khilanmarg and thence climb Affarwat on foot. Gulmarg has been developed as a modern hill station and continues to attract visitors, mostly Europeans, in increasing numbers, in the summer. It also attracts ski-ing enthusiasts in December, January and March each winter, when meetings are arranged by the Ski Club of India. 361 485 133

Toshmaidan.—This can be reached by three marches from Gulmarg, and is one of the most beautiful *margs* (literally meadows or pasture lands) of Kashmir. The path is steep, but fit for ponies.

Ganderbal.—This is a small village on the banks of the Sindh river at a distance of 13 miles from Srinagar, and 5,220 feet above the sea level. Visitors generally stay in boats moored along the river. By road it is half an hour's drive from Srinagar. As in Pahalgam and Gulmarg, there are here post and telegraph offices, the Government dispensary and a police station. The Sindh river and its tributaries in Ganderbal supply fish in abundance. Ganderbal is the starting point of excursions to famous places like Sonamarg, Baltal, Zojila mountain, Lake Gangabal and the Harmukh mountains.

Sonamarg.—This glacier valley is at a distance of 51 miles from Srinagar, and is 8,750 feet above the sea level. It presents one of the finest pieces of scenery in Kashmir and is noted for its bracing climate. A portion of the road to Sonamarg is metalled and the remaining is a fair-weather motor road. Large camping grounds are available in the valley. The famous Sri Amarnath cave and the Kolahoi glacier in the Liddar valley are accessible from this place also. Snow trout are available in the river at Sonamarg. [491]

Gangabal.—This glen is about 11,720 feet above the sea level and contains an attractive lake. On one side of the lake rises the towering peak of Harmukh (16,900 feet). It is a place of pilgrimage for Hindus. [788]

(4) Lakes.

133 **Dal.**—This beautiful lake is over $3\frac{3}{4}$ miles by over $2\frac{1}{2}$ miles in size. The background is provided by mountain ranges which rise 3,000 to 4,000 feet above the level of the lake. The water is fresh and abundantly supplied [367] with fish, wild duck and water-fowl. One of the main features of this lake is the famous floating gardens. The lake is a favourite place for the mooring of house-boats. One of the corners of the lake is Gagribal, noted for its very clear water. It is an ideal place for bathing. Registered bathing boats, sailing boats and motor boats for aqua-planning are available on hire at the Gagribal point.

Anchar.—This is 5 miles long and 2 miles wide, and extends towards Ganderbal. It is a good place for duck and snipe-shooting in winter months. Lotuses and lilies are to be seen here in profusion in the month of August.

Wular.—This is the largest fresh water lake in India, and is $12\frac{1}{2}$ miles long and 5 miles wide. The lake can be reached from Srinagar by river as well as motor road.

Manasbal.—This lake, about 16 miles from Srinagar, is accessible both by road and river, and is considered to be the loveliest of the Kashmir lakes. About 2 miles in diameter, it is surrounded by majestic hills, and its water is blue and clear. The ruins of a fine Mughal garden are situated on one of its banks.

Kaunsarnag.—This is the largest mountain lake in Kashmir. It is situated on the Pir Panjal range, about 13,000 feet above the sea level and is over 2 miles long. It is surrounded by some of the most picturesque of the Himalayan peaks. Three of these peaks, each about 15,500 feet high, tower over this lake which usually remains frozen till the month of June.

Shishnag.—This is a mountain tarn situated at an altitude of 12,000 feet on the pilgrim road to the Sri Amarnath cave.

(5) Ancient Monuments.

172 **Pari Mahal (Palace of fairies).**—A massive building, now in ruins, standing on the side of the mountain to the south of Lake Dal: it is said to have been erected in the time of the Mughal emperors for astronomical

659 standard of living of population in general, and of India (which is 80 per cent. agricultural, depending upon the mercy of timely monsoons) in particular would constitute a fairly good criterion for natural divisions.

But from the practical viewpoint neither of the above two criteria would by itself be sufficient as the presentation of results merely by the natural divisions will defeat the very objects for which a Census is taken by the Government who want to know the distribution of people and their condition in each administrative unit of the country to enable their provincial Governors, District officers, and Tehsildars to take necessary steps for the improvement of conditions in their respective jurisdictions. Experience has shown that it is always wiser to steer the middle course and accept a compromise between the two criteria by following both the methods in exhibiting the conclusions of the Census. The facts should therefore be stated by administrative divisions and the theory based on natural divisions whenever possible. Nowhere is the task of formation of natural divisions fraught with greater difficulties and complications than in the Jammu and Kashmir State where vicissitudes of climate and rainfall and variation of altitude are so pronounced that it is well nigh impossible to find fairly large tracts possessing homogeneous characteristics to enable sound grouping into distinct natural divisions. Not to say of homogeneity of physical features in a province it is rather difficult to find a district possessing same characteristics throughout. Speaking of the Kashmir Valley Sir Walter R. Lawrence has observed:—

"Every hundred feet of elevation brings some new phase of climate and of vegetation and in a short ride of thirty miles one can pass from the overpowering heat to a climate delightfully cool, or can escape from wearisome wet weather to a dry and sunny atmosphere."

If these remarks are true of the great valley a level stretch of country, they are applicable with much greater force to the Frontier Districts having ranges with perpetual snows ensconsing within their folds a large number of valleys and places enjoying the driest climate in the world with practically no rainfall. In view of the aforesaid difficulties it would be futile to attempt any fresh classfication of the natural divisions of the State and consequently we adopt the scheme of Natural Divisions propounded by Fredric Drew Esquire, F. R. G. S., F. G. S., in his "The Jammu and Kashmir Territories" (a geographical account) published in 1875 A. D. with necessary modifications made by Khan Sahib M. Matiuzuman Khan, the Superintendent of Census of this State in 1911, to suit the special requirements of the Census. Sticking to the old divisions has the further advantage of judging the comparative values of the figures with a great degree of accuracy than would otherwise be possible.

131 **The Four Natural Divisions are** :—(*i*) *The Sub-montane and the Semi-mountainous Tract.*—This is partly plain and partly broken Kandi country
● 133 skirting the mountain ranges of the Himalayan series, and consists of tehsils
161 Kathua and Jasmergarh of the Kathua district, the entire district of Jammu comprising Samba, Ranbirsinghpura, Jammu and Akhnoor tehsils, and tehsils Bhimber and Mirpur of the Mirpur district. The southern portions of these tehsils bordering upon the Punjab districts of Jhelum, Gujrat, Sialkot and Gurdaspur possess fertile tracts growing rice, wheat, maize and other crops. This region has been designated by Mr. Drew as "The plain in front of the hills" through which flow the three great rivers of the Punjab namely the Ravi, Chenab and Jhelum as also some perennial streams flowing with sufficient water throughout the year. The irrigation of this tract is carried out partly by canals drawn out of the big rivers (The Ranbir Canal, the Upper Jhelum Canal, the Basantpur and the Ujh Canal) and partly by sma l *Zimindari Kuhls*. The Ranbirsinghpura tehsil is the most fertile tract in this region having the best soil and receiving sufficient water from the Ranbir Canal; while Samba is the poorest with sandy soil thirsting for water. The northern portions of the above tehsils called "Kandi" being located at a higher level 1,100 to 1,200 ft., has stony and sandy soil where cultivation is meagre and uncertain mostly

*[Errata: read "have" for "has"; cf errata sheet, p. 329, category IIb -- Analyst]

depending upon timely rainfall. The population of this division consists of 7,12,456 souls and the area is only 2,606 square miles. 131 133 ●

(*ii*) ***The Outer Hills.***—This comprises the whole country of low-lying hills (called Sewalik or Sawa Lakh) in the south of the Pir Panjal mountains which partition the Jammu and Kashmir provinces and whose snowy peaks render the Kashmir valley inaccessible from the Jammu side during the winter months. Tehsil Basoli of Kathua district, the Riasi district, the Udhampur district and tehsil Kotli of the Mirpur district are all included within this belt which consists mostly of country 2,000 ft. to 3,000 ft. high, though in Bhadarwah and Kishtwar the hills reach a height of over 5,000 ft. 161

Excepting the fertile valley of Bhadarwah the country has only patches of cultivated areas spread between the hills covered with scanty and stunted forest growth which assumes larger and thicker proportions as higher elevation is reached where the pine and deodar forests form a great source of wealth to the State. Much of the mineral wealth of the State also lies buried in this part of the country and Reasi bids fair to play the role of an important metallurgical centre of the State in future. Although irrigational facilities are very scanty, being arranged by small *Kuhls* drawn from mountainous nallahs or springs, but the cultivation is greatly helped by the larger precipitation that this region is blessed with on account of its proximity to the high Pir Panjal mountains which compel the moisture bearing winds to deposit most of their aqueous vapour in this part of the country. There are fairly populous and well cultivated valleys among the mountains such as Poonch and Rajouri and in the valley of the upper Chenab are the valleys of Ramban and Bhadarwah. Rice and wheat are grown in some parts while maize is the staple food of the Illaqa. The area of this division is 9,795 square miles and population runs upto 1,075,985 persons.

NOTE.—The Division I and II constitute the entire Jammu Province.

(*iii*) ***The Jhelum Valley.***—This includes all the three districts of the Kashmir Province having ten tehsils in all:— 631

1. Srinagar District	...	1. Srinagar,
		2. Anantnag,
		3. Kulgam,
		4. Awantipura,
2. Baramulla District	...	5. Baramulla,
		6. Sri Pratapsinghpura,
		7. Uttarmachhipura,
3. Muzaffarabad District	...	8. Uri,
		9. Karnah, and
		10. Muzaffarabad.

The seven tehsils of the Srinagar and the Baramulla districts constitute the Kashmir valley proper while Muzaffarabad district (of which only a few villages in Uri enjoy similar characteristics) has also been clubbed into this group to coincide with the administrative division; otherwise this hilly tract with insufficient cultivation and precarious agriculture would rightly fall within the Outer Hills Division. The mountains enclosing this tract have been termed as "The middle mountains" ranging on the average between 8,000 to 10,000 ft. in height although many of the peaks reach 14,000 to 15,000 ft. The valley 133 131

* [Errata: cf. category 116, p. 329 for corrections -- Analyst]

131 of Kashmir situated at over 5,000 ft. above sea level and the beautiful side
133 valleys of Sindh and Liddar also belong to this division.

It is needless to speak here of cultivation in the valley which is very close
241 and plentiful yielding abundant harvests of Shali (Paddy) the staple food of the
161 Kashmiries. Irrigation is supplied by the *Kuhls* drawn from natural water courses fed by the surrounding snow-clad mountains. The valley is famous for the large variety of its fruits which are exported to the plains in ever-increasing quantities. Besides rice or paddy, maize, wheat and tilgoglu also are grown while Trumba (Buckwheat) is grown on the higher regions in small quantity. The area of this division is 8,539 square miles and the population comprises 1,569,218 persons.

131 (*iv*) *The Indus Valley or the Tibetan and Semi-Tibetan Tracts.*—These
133 form the central portion of the valley of the great river Indus, which taking its source at the Mansarowar lake in Tibet proper traverses the whole of the frontier
161 region of the State running from south-east to north-west upto the bend round Nanga Parbat whence it assumes south-westerly course till it enters the sea after covering a total length of 1,800 miles from the source. Enclosed by Karakoram on the north and the central range of the Himalayas on the south this division comprises three-fourth of the area of the State but on account of its high altitude and highly mountainous and barren character maintains a population of only 288,584 people giving a density of 5 persons to a square mile. Except Gilgit the ranges in this Illaqa vary from 17,000 ft. to 22,000 ft. and in Ladakh there are vast deserts, *i. e.*, Linghzithang 1,6000 ft. and Kuenlun (17,000 ft. above
631 sea). This includes the three separate administrative divisions:—

1. Ladakh District	...	1. Ladakh, 2. Skardu and 3. Kargil Tehsils.
2. Gilgit District	...	Gilgit Tehsil.
3. Frontier Illaqas	...	Hunza, Nagar, Yasin, Chilas, Ishkoman, Kuh-Ghizar, Punial Illaqas included in the Gilgit Agency.

133 The physical characteristics of the various portions of this country differ very widely and we have almost rainless and therefore dry and barren tracts of Ladakh on the one extreme and Baltistan and Gilgit with their lower hill sides and valleys verdant with orchards and corn fields on the other.

×162 The Ladakh tehsil is peopled by the Mongoloid (Tibetan) race who
241 own allegiance to Budhism while Skardu and Kargil are inhabited by Muslims of Shia and Nurbakshi sects belonging to semi-Tibetan race called Balti. The cultivable area being very small and the rainfall very deficient agriculture is carried on by artificial irrigation with great difficulty and labour, and it is not unoften that terraced fields are reclaimed at the foot of the overhanging cliffs. The Ladakhi custom of polyandry keeps the small holdings intact as the joint family and common-wife system of the Budhists prevents fragmentation of holdings and also acts as a great check on population. Grim is the chief crop of Ladakh which grows even at a height of 15,000 ft. The population of Gilgit is constituted of Muslims of the Dard race and this small tract enjoys far better climate and cultivation than Ladakh; producing wheat and other crops as also fruits. The production in Political Illaqas is again of an inferior kind.

631 **3. Administrative Divisions.**—As at the preceding Censuses, the State may be divided administratively into two broad divisions:—

(*a*) **The State proper.**

(*b*) **Dependancies and Jagirs.**

4 [Errata: read "giram" for "grim". cf. errata sheet, p. 329, category 116 -- Analyst]

6:India G-3 (1931)1933

AVI Kashmir AVI

161 thinly populated as the State. A mere glance on the following density figures will disclose the futility of any attempt at such comparison :—

	Density per square mile.
Great Britain ...	480
Germany ...	347
Italy ...	340
Belgium ...	669
Holland ...	605
China ...	272
Japan ...	608
Java ...	817

But if on the other hand we resort to the sparsely populated countries which have only recently added to their indigenous population by taking in immigrants from the densely peopled areas it is seen that there are countries with very large habitable area having far lesser density than ours and even United States of America is included therein sustaining only 40 persons to a square mile.

	Density per square mile.
Australia ...	2·12
Canada ...	2·55
United States of America ...	40·0
Newzealand ...	14·1
South African Union ...	15·2
Brazil ...	13·0
Mexico ...	19·0

161
133 Although arithmetical calculations yield an average density of 43 persons only as against 39 of the last Census but this low figure is calculated to give a false impression to the outside world to the effect that there is ample scope in the attractive Valley of Kashmir (by which name the State is generally known abroad) for taking in at least five times its present population, as such a conclusion can easily be based on the Theory of Trunniers, a German statistician who held the view that even agriculture alone can support upto 250 persons to a square mile, although this theory has not been accepted without reservations.

To give a correct idea of the State of affairs it is essential that abnormal factors should be eliminated from the computation of density and if in the present case the figures of the Frontier Districts (which have only 5 persons to a mile) which have large barren tracts comprised of naked deserts and mountain ranges several thousand feet above the sea-level are eliminated the density for two provinces *i. e.*, Jammu and Kashmir will approach the respectable figure of 160·5 persons to a square mile which compares very favourably with Gwalior, Hyderabad, Central Provinces, N. W. F. Province, Bombay and also with India as a whole (195).

161 13. **Inter-territorial Density.**—Although we must reserve the discussion of growth of population by Natural Divisions of the State to subsequent pages, yet it seems essential to give a brief account of the densities of the internal Administrative Divisions to complete the picture. In this connection reference may be made to last column of the State Table I in Volume II of the Report which will disclose a very wide disparity between the densities of tehsils. Commencing at the lowest rung of the ladder with the Ladakh tehsil having a density of 1 person per square mile we rise higher and higher through every range of density passing Kishtwar (16), Karnah (39) and Bhadarwah (75) till we reach the better

4 [Errata : read "happy" for "attractive"; cf. errata sheet, p. 249, category 116 -- Analyst]

132 The cause of high precipitation here is that the Monsoon which manages to reach these outer ranges of the Himalayas is deprived of its entire acqueous vapour by these mountains on the Punjab side of the Pir Panjal preventing its onward march and penetration to the Happy Valley which is very slightly, if at all, influenced by Monsoons.

132 161 (b) The second belt classed as the Poor Rainfall Division (20" to 40") comprises ten tehsils which have a density above 200 excepting entirely mountainous tehsil of Kishtwar (18) and partly mountainous Anantnag. It is in this belt that the highly populated tehsils of Ranbirsinghpura (527), and Srinagar (501) are located as also the fairly dense tehsils of Pulwama (334), Sri Pratapsinghpura (334), Baramulla (252), Kulgam (248), and Mirpur (285). For Kashmir which has a temperate climate a rainfall between 15" and 40" is considered sufficient for all kinds of cultivation as in such regions both evaporation and rainfall are generally less and consequently the population all over the Kashmir Valley is fairly dense.

(c) Next comes the belt of a very poor rainfall (below 15") with Kargil (density 7), Skardu (13), Gilgit (19) and Ladakh (1) all of which come last in regard to density; Ladakh tehsil having a rainfall of 3" exhibiting one man per square mile. Here the relation between rainfall and density is self-evident.

The above shows that rainfall has a great influence over the growth of population in all tehsils provided other conditions are equal.

161 312 241 (b) *Density and Irrigation.*—For the conduct of cultivation, water is the essential element and where Nature is not liberal enough in the distribution of a fair quantity of rainfall artificial means of irrigation whether by canals, tanks or wells make up for the deficiency. Instances are numerous where barren and dry tracts of land have been converted into flourishing fields through the improved irrigational facilities and have in consequence attracted large masses of human settlers. Lyallpur in the Punjab with an annual rainfall of 13 inches had in 1891 a density of 7 persons to a square mile but during the last 40 years it has grown so populous that its density at 1931 Census has now reached to 368 persons and is still growing.

The non-reliability of Census statistics of the State before 1911 makes it difficult to properly appraise the effects of irrigational works in influencing the growth of population, but even during the last twenty years the increase of density in Rarbirsinghpura tehsil from 428 to 527 and that of Jasmergarh from 241 to 281 and of Jammu from 313 to 387 is undoubtedly due in a large measure to the irrigational facilities afforded by the Ranbir canal and the Ujh and Basantpur canals in Kathua district.

133 141 (c) *Density and Configuration of the surface of land.*—Even where the supply of water by rain or irrigation is sufficint cultivation will not be full if the surface of the land is uneven. Throughout India, it is the level plains (of the Ganges, Punjab and other rivers) which are most thickly populated as in such places every inch of the land can be brought under the plough and water can be retained in the field to supply the moisture.

The table given under rainfall and density shows that in the State also it is the level plains at the foot of the hills in Jammu and the plains of the Kashmir Valley that support large populations while the hilly tehsils of Ramnagar, Riasi and Basohli etc., inspite of having highest rainfall are not thickly peopled on account of their hilly character.

132 161 (d) *Climate.*—The presence of masses of snow-covered mountains and the high altitude render the climate of part of Kashmir Valley very cold during the winter and the closing of the passes to the Frontier Illaqas during the

312 In Jammu the extension of the Ujh Canal was started at an estimated cost of Rs. 695,422 in the year 1924 and major portion of the work is nearly finished. Moreover extension to Distributary No. 9 of the Ranbir Canal has also been carried out at a cost of Rs. 140,032.

During the decade under report the length of the canals has increased from 325·21 miles to 460·78 miles giving a net increase of 135·49 miles in length and increase of 46,965 acres in area which no doubt is a record of good progress. Out of a total expenditure of Rs. 11,813,000 incurred on irrigation works from 1902-03 upto end of 1928-29 Rs. 3,496,361 were spent during the last decade. The expenditure on irrigation works from 1921 to 1929 amounts to Rs. 3,486,361 while the receipts come to Rs. 2,643,964. The position may be summed up in the words of the Chief Engineer, Public Works Department as follows :—

"Looking at either from the point of view of the revenue realised by the State or the prosperity of the Illaqas in which the various canals pass there can be no doubt that they have more than amply fulfilled the expectations with which they were started. Vast areas in the Jammu and Kashmir Provinces have now been made fertile. Places which at one time appeared wilderness and uninhabitable and suffered even from want of drinking water are now full of green fields and well grown fruit gardens. The price of the land has considerably increased and the inhabitants are now in a comparatively prosperous condition".

133 164 **19. State of Public Health.**—In a vast country like Jammu and Kashmir State with no homogeniety of climate and seasonal conditions, the factors governing public health are so varied that it is difficult to form a correct estimate for the entire country is to the propitiousness or otherwise of the individual years much less of a decade. The big mountain barriers divide the territory into distinct water tight compartments each possessing separate traits of climate with the result that while the Jammu Province might be passing through a severe epidemic of Plague the province of Kashmir is found to be immune from the touch of the epidemic, and on the other hand prevalence of Cholera in Kashmir in particular years has little effect upon Jammu, not to say of the far-flung Frontier regions.

164 744 This view derives ample support from the survey of the various epidemics during the last decade. During the period of ten years 1921-30 there have been 9 annual visitations of Plague in the Jammu Province more especially in the Jammu district while Kashmir Province enjoyed complete immunity for all these years with the exception of 1926 when in the month of November Plague broke out in the Awantipura and Kulgam tehsils claiming 38 victims. As regards Kashmir Cholera has visited the province in 1924, 25, 27, 29 and 30 but with the exception of 1929 when 70 persons died of Cholera in Basohli tehsil the Jammu Province has been almost free from the disease. The total mortality from the infectious diseases is given in the following table :—

Cholera	... 19,857
Small-pox	... 15,546
Plague	... 5,251

Plague.— The total deaths from plague in the Jammu Province came to 5,222 as against 9,134 of the last decade which shows that although the visitations of the epidemic have been frequent and regular the loss of life has been reduced by almost 50 per cent. which is due to the prompt and effective measures taken to combat the disease by the Health and Medical Departments in the shape of systematic trapping of rats, disinfection of houses and anti-plague inoculations. With the exception of the epidemic of 1924 which levied a toll of 2,242 lives the course of the disease has been sparodic and unperceived.

The only exceptional turn taken by the disease was to make its appearance in the Kashmir Province in 1926 when the Kulgam and Awantipura tehsils

K 161 decennial increase comes to 5·64 per cent. against 3·1 of the previous decade representing a fairly satisfactory state of affairs for these tracts.

[K 131] The total area of this division is 63,560 square miles or three-fourths of the area of the entire State while the population supported by this huge area amounts to only 288,584 persons *i. e.*, 7·9 per cent. of the total population leading to a resultant density of only 5 persons to a square mile against 183 of the Kashmir Province and 144 of the Jammu Province inclusive of Jagirs. The figures of density offer their own commentry and no words are needed to establish the extreme sparseness of the population in these parts. Taking into consideration of variation from decade to decade it will be evident that internally the tract has grown in population from 160,225 in 1891 to 288,584 in 1931 yielding a total increase of 128,359 persons or 80·1 per cent. in the forty years which represents the highest increase over this long period as compared with the other two provinces or any of the districts. But a study of the figures of percentage variation of this division in the Subsidiary Table No. III shows that there is a progressive decline in the percentage increase rate from decade to decade as is evidenced by the big fall from 44·0 per cent. decennial increase in 1891-1901 to 14·2 in 1901-1911 and to 3·1 in 1911-1921. This leads us to the conclusion that the figures of the earlier Census of these tracts were far from being accurate and as each succeeding decennium is conducive to greater accuracy we may rightly conclude that the rate of increase which is manifesting itself at the recent decades represent the true state of affairs and the figures of the remote decades are not free from suspicion.

Coming to density proper the present Census gives a record of 5 persons to a square mile against 4 of the last Census which naturally means an increase in density by 25 per cent. but looking deeper into the figures we see that the actual density in 1921 was 4·29 and in 1931 it is 4·54 which gives a net increase of ·25 and reduces the percentage increase to a reasonable figure of 5·8 per cent. from 25 per cent. shown above on the basis of round figures.

K 133 241 The reasons for this dearth of population in this part of the State are not too far to seek as the highly mountainous character of the tract coupled with vast treeless deserts at an altitude of 17 or 18 thousand feet above the sea-level offers very little attractions to settlers who will scarcely find any land available for cultivation here especially when only ·3 per cent. of the total area is fit for cultivation and the normal rainfall does not exceed 5·7" which is hardly suitable for growing any crops. The passes remain closed during the winter when communications are generally cut off and the transmission of post is also attended with considerable difficulty. There are no roads worth the name.

K 161 The decade under report presents a record of increase in all the constituent units and the variation from 1·7 to 4·72 in the Ladakh district marks a decided improvement while the lowering of the percentage increase in Gilgit and Political Ilaqas is due to more careful enumeration leading to greater accuracy. It is a patent fact that at the present Census efforts have been made for the first time to obtain more detailed data of the Frontier Ilaqas which hithertofore were enumerated on a special form having four or five columns instead of the General Census Schedule provided with eighteen columns.

W.T. 161 **49. Ladakh District.**—Having said so much by way of introduction we shall review the tehsil comprising this district in passing with the help of the marginal table. Starting with the Ladakh district having an area

Name of District or Tehsil.	Population 1931.	Density.	Percentage of Variation.		
			1921-1931.	1911-1921.	1901-1911.
Ladakh District ..	288,328	5	+ 5·72	− 1·7	....
1. Ladakh Tehsil ..	34,432	1	+ 4·16	− 2·9	....
2. Kargil	86,320	7	+ 5·26	− ·1	....
3. Skardu	167,577	13	+ 4·60	− 2·6	....

[Errata: of category 116, p. 329 for corrections — Analyst]

1: Lawrence G-S (1889-1895) 1895 AV4 Kashmir
Kashmir AV1

CHAP. II.

other hill station of the outer Himalayas, but in February it is apparently damper, and in the remaining months of the winter and spring of about the same character. The humidity is highest in August, when it amounts to about 80 per cent. of saturation. In March the skies are as cloudy as during the rains. In the spring months, from March to May, it rains on an average about one day in three, most frequently in April. The rainfall on each rainy day averaging about one-fourteenth of an inch. Rain is less frequent in June, but increases again in July and August, when about half the days are more or less rainy and the falls heavier than in the spring, averaging three-quarters of an inch on each day of rain. The number of rainy days has varied from 74 only in the dry year 1880, to 123 in 1885, and the total quantity from 39·1 inches in the former to 71·8 inches in the latter year.

'October and November are the clearest months, but even these, and every month up to May, are more cloudy than at Simla or on the plains. On the other hand, in July and August there is less cloud than at Simla or other more easterly stations, as might be expected from the smaller frequency of rain.

'Leh.[1]—Situated 4° further north than Quetta, and 6,000 feet higher, this station in the leading characteristics of its climate represents that of Western Tibet. Its observatory, 11,500 feet above the sea, is the most elevated in Asia, and has now furnished a register for twelve years.

'Leh,[1] the chief town of the province of Ladákh, is situated in the upper valley of the Indus, which is here from six to eight miles across for a distance of forty or fifty miles, and shut in on both sides by portions of the Tibetan plateau, averaging 16,000 feet above sea-level, and bearing some of the loftiest ranges of the Himalayas. The flats and terraces along the banks of the river are all cultivated, and dotted with numerous villages, but for a mile on each side, between the fields and the foot of the hills, is a waste of sand, gravel, and large boulders, similar to that which fringes the much lower hill ranges of Baluchistan, but on a larger scale. The town of Leh nestles under the hills north of the valley, at a distance of some four miles from the river, up a long gentle, gravelly slope.

'The atmosphere of the valley is remarkably clear and transparent, and the heat of the sun very great. There is generally a difference of more than 60° between the reading of the exposed sun thermometer in vacuo and the air temperature in the shade, and this difference has occasionally exceeded 90°. It has been mentioned on a former page that Dr. Cayley succeeded in making water boil by simply exposing it to the sun in a small bottle blackened on the outside, and shielded from the air by inserting it in a larger phial of transparent glass. Owing to the diminished pressure of the atmosphere at the elevation of Leh, this would, however, take place

[1] [Notes by Eliot. See category 116, p. 27 for identification of Eliot -- Analyst]

6:Spate N-4 (no date)1954 AWI India
KASHMIR AVI

Sub-Himalayan Kashmir: Punch and Jammu

Very broadly speaking, Kashmir consists of two huge mountain masses —the Karakoram in the far N, the Himalaya/Zaskar to the S, with the Indus entrenched between them; and, on the Sn flanks of the main Himalaya, the famous Vale, walled in by the Pir Panjal which in turn breaks down into the lower but highly dissected Tertiary hills of the Punjab border (Figs. 63, 64). In actual fact the detail is exceedingly complex and the breakdown into seven units of study rather arbitrary, though not entirely so. 133

Kashmir includes a narrow strip, 5–15 miles wide, of the Punjab plains, here at 1100–1200 ft; this tract is badly ravined and of little significance except for the inclusion of the Mangla headworks of the Upper Jhelum Canal. N lies a belt of Siwalik terrain, hills up to 2000–4000 ft, largely anticlinal and overlooking a series of *duns*—longitudinal valleys—succeeded in turn by the Miocene Murree sandstones and Eocene Nummulitic limestone at 6000–8000 ft. The Siwalik zone, a "pile of rock waste" up to 20,000 ft thick, has undergone very recent folding and faulting, including early Pleistocene thrusting. In the earlier Tertiary zone strike-faults have disrupted anticlines and brought in massive Permo-Carboniferous limestones forming the higher ridges. The upper Murrees are preserved on the downthrow (Sn) side, while to the N the lower Murrees and the Nummulitics, resting with a great unconformity on the Permo-Carboniferous, are greatly disturbed and the terrain correspondingly confused; yet, "although dissection is intense, their heights display unmistakable signs of an older topography. Levelled spurs and plateau remnants, valley flats and abrupt terminations of high valley floors along master streams, indicate a mature relief which underwent rejuvenation".[6] This sub-Himalayan zone ends in the great boundary thrust-faults, beyond which the Pir Panjal rises steeply.

Rainfall varies with aspect, but in general lies between 35 ins. in the W and 28 in the E, with a fair contribution in January–March; temperatures are of course affected by altitude and aspect. The low outer ridges carry a sparse dry scrub, the inner rather better forest, largely of *chir* or *chil* (*Pinus longifolia*); but felling for rafting into the Punjab has made serious inroads. 132

The Siwalik and Murree terrain, with thin thirsty soils, very liable to erosion and often degenerating into pebble-spreads, is agriculturally poor, as are the limestone slopes. Here and there, in *duns* and in a piedmont belt at the foot of limestone scarps, conditions are better. Irrigation is limited, as the water-table is generally deep for wells, and channels are liable to be overwhelmed by spates from the numerous transverse gullies; while some lower areas are so fever-ridden that cultivation is largely carried on by a 134 241

[6] de Terra (1939), 8, 18. Until further notice, citations to de Terra are from this very admirable work.

6:Spate N-4 (no date)1954 AWI India
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241 seasonal immigration of hillmen. Wheat, barley, and rape are grown as rabi, maize and bajra as kharif. Higher up, in wider, better-watered valleys, bajra gives way completely to maize. Irrigation is difficult here also, as streams are incised, but it is not so necessary as in the lower valleys.

135 The unexploited mineral resources of the region are important. In Riasi Dt the Nummulitics contain three or four small fields with seams of anthracite (carbon 60–82%) up to 20 ft thick; farther W the coal is very friable and the thin seams too disturbed to be workable. The pisolitic limonites and ironstone of the same area and formation were exploited by indigenous methods in the past, and in view of the general mineral poverty of Pakistan might have some importance should she secure title to the area. The basal Eocene beds are fossil laterites, an old land-surface on the Permo-Carboniferous, and contain patches of pure bauxite forming a large reserve of aluminium ore.[6]

161 563 The region is fairly well peopled: densities range from 327 in Jammu and 238 in Mirpur to 144–174 in Riasi and Kathua, which contain definitely mountainous areas. All these showed decreases 1931–41, by as much as 15% in Jammu. The SE is strongly Hindu, 60–70% and locally over 80%, and should partition take place Jammu, Kathua, and Udhampur would be indisputably *Indian*: this is the home of the Dogras, the dominant minority in the state. Jammu (50,379) was the original base of the ruling house, whence the official title of the state is 'Jammu and Kashmir'; it is still the winter capital and the terminus of the only railway, a short line from Sialkot. To the W Punch is over 90% Muslim, a feudatory generally on bad terms with its Kashmiri overlord.

433 [313] [371] The whole region is of less significance in itself than in relation to W Punjab. The SE might well be detached, but the rest normally plays a very important part in the economy of W Pakistan. Its forests are the main supply for a country desperately short of timber,[7] while Riasi might at least mitigate the mineral deficiency. In addition the importance to the W Punjab of the Mangla headworks and of the hydro-electric potential can hardly be over-estimated.

133 274 Finally we may note the essentially similar, though rather higher, country across the Jhelum, which forms much of Rawalpindi and Hazara (NWFP). Murree, a hill station at the usual 6500–7500 ft, was chiefly noted for brewing; the high barley acreage of the region may have been significant.

The Pir Panjal

133 The Pir Panjal is in a sense a bifurcation from the main Himalaya farther E. Structurally and lithologically it is most complex; thrusting is important

[6] D. N. Wadia, *Geology of India* (1939), 339, 348, 431–2.

[7] The *Indian* counter-argument that the main customer was the railway system, three-quarters of which went to *India* on Partition, is transparent enough.

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Fig. 63.—The Kashmir Himalaya. Figures along Indus are height of river above sea-level (in thousand feet). Passes: K, Karakoram; Bu, Burzil; Z, Zoji La; PP, Pir Panjal; B, Banihal. NP, Nanga Parbat; H, Haramukh.

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Pir Panjal

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Fig. 64.—Potwar to Ladakh: Block Section of Kashmiri Himalayas. Line of confluence; vertical exaggtn 8·3. Geology (based on de Terra) diagrammatic: 1, Siwaliks; Permian-Cretaceous) in NE; 4, older Palaeozoic; 5, younger Palaeozoic igneous; 6,

[FIG 64-A]

and Wadia considers it as the front of a great Kashmir nappe. The massive Permo-Carboniferous limestones, metamorphics, and intrusives form a broad swelling platform at about 13,000 ft, on which lies a serrated residual crest, the highest monadnocks reaching 15,500 ft. The passes lie as a rule at 11,000–12,000 ft.

The contemporary glaciation presents interesting features. Most of the thirty-odd small glaciers are on the Nn slope, in contrast to the Himalayas farther E where there is relatively little ice on the arid Tibetan side. The Pir Panjal snow, however, comes mostly in winter, from W or NW, and the Sn aspects are more exposed to warm air-currents from the plains. Only one or two of these glacierets have real valley tongues, the lowest at 11,600 ft; most of them are simply cakes of ice in wide cirques which form the collecting grounds. The river-pattern is very striking, with the great bends of Chenab and Jhelum (the latter controlled by the syntaxis), the tributaries at these bends carrying on the line of the lower main streams, and a general lay-out of feeders suggesting that the drainage was originally to the SE.

[137] The Sn flank is wetter than the Nn, but slopes here are so often too steep for soil formation that the larger coniferous forests are mostly to the N. The SOI I. 1/2,000,000 maps carry the Pir Panjal across the Chenab, the upper (Chandra Bhuga) Valley being closely inset in the angle of the Pir Panjal and the main Himalaya. The lower levels of this high basin (6000–12,000 ft) in the W carry a fair population; the density of Udhampur Dt is 58, and unlike the rest of Jammu it increased slightly from 1931 to 1941. The climate here is definitely cold, "the mango-tree gives place to the apple"; but terraced irrigation is not too difficult, and rice is important.

[161]

487 The region is, however, essentially negative, a barrier. Of the routes into the Vale the most direct is the old Mogul road by the Pir Panjal Pass (11,400 ft), which gives its name to the range. This is now of little importance, the main entry (in normal times) being by the motor road up the

6:Spate N-4 (no date)1954 AWI India
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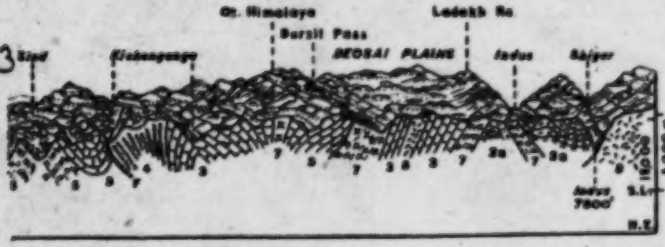

section on bearing 38° for 430 miles (690 km.) from Jhelum town to Indus below Shyuk 2, Murree; 2a, Flysch; 3, Permo-Carb. (thrust onto 2), and 'Tethys' formations (U. Karewas Beds; 7, Cret.-Eocene eruptives; 8, granites. F, major faults and thrusts.

[FIG. 64-B]

487 Jhelum valley—excellent engineering but costly to maintain. At the other end of the Vale access is had from Jammu and the Chenab via the Banihal Pass (9290 ft), also motorable though with more interruption by snow than the road from Rawalpindi. Military and political needs have led to the hasty construction of a long projected direct link with *India* by the Banihal, the last stage on the road from Gurdaspur through Kangra and Chamba in the sub-Himalayan Punjab.

The Vale of Kashmir

The Physical Setting

133 Between the Pir Panjal and the main Himalaya lies the famous Vale of Kashmir, a great basin about 85 miles by 25 with a floor which in the Jhelum floodplain is only 5200 ft above sea-level. Wadia and de Terra agree in regarding it as a great synclinal, which according to Wadia is seated on the back of a vast nappe.[9] The Sn flanks fall relatively regularly and gently from the Pir Panjal crest, but the Jhelum thalweg lies close to the Nn side of the Vale, and here facetted spurs give a clear indication of faulting; similar features on the Pir Panjal slope are as a rule masked by the Pleistocene deposits. The stream pattern is interesting. The Nn wall is dissected by the Sind and other rivers which are antecedent to the immediately bordering hills; but beyond the ridge crowned by Haramukh (15,999 ft) the NW end of the valley shows a well-adjusted synclinal pattern, significantly "rather suggestive of an ancient headwater portion of a master stream".[10] On the Pir Panjal side the upper valleys are incised and dendritic, but farther down the rivers have developed on parallel courses, consequent on the uplift of the Karewas Beds and antecedent to the folds in them. As we are about to see, the geomorphological evolution is extremely recent.

Among the most striking features of the Vale are the flat-topped ter-

[9] Cf. Fig. 34 in Wadia, *op. cit.* (1934), 315. [10] de Terra, 23.

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races known as *karewas*, which term is also applied to the Pleistocene sediments of which they are composed. These deposits consist of clays, sands, and silts of undoubted lacustrine origin, in which bands of marl and of loessic silt, together with lenticles of conglomerate from old deltaic fans, bear witness to many fluctuations of level. The sequence of events suggested by de Terra [11] is: (i) capture by the Jhelum of an original subsequent flowing to the SE, probably along the longitudinal course of the Chenab [12]; (ii) Pir Panjal uplift blocking this exit; (iii) filling of the lake and overspilling; (iv) alternate draining and deepening of the lake in response to glacial changes and changes in the ratio of uplift and erosion at the spill; (v) continued uplift accompanied by cutting-down of the Jhelum and complete drainage of the lake. It should be noted that the various existing lakes, of which Wular is the largest (area 12 to 100 sq mls, according to season and flood) are not strictly relics of the ancient lake, but rather enlarged old oxbows and abandoned courses of the Jhelum; in some cases ponding by detrital fans from the hills seems to be responsible.

In places the *karewas* have been eaten into great bluffs by the Jhelum, and the terrace lies at 450 ft above the river. On the S Karewas Beds extend from about 5400 up to 9000 ft, and are quite steeply tilted. With the Pir Panjal uplift the deposits were folded and in places faulted, another striking testimony to the persistence of orogenic process into recent, perhaps even contemporary, times. To summarise, we have [13]:

First interglacial . .	Lower Karewas deposition (*c.* 2000 ft), lake beds, fluvial inwash and eolian drift
Second glaciation . .	Karewas gravel (*c.* 400 ft), glaciofluvial outwash fans
Second interglacial . .	Upper Karewas, *c.* 200 ft—"topmost beds of eolian and fluvial origin; lower beds lacustrine; also fluvial outwash (partly varved)."

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The word *karewa* applies strictly to the level surface between the incised streams dissecting the terraces, the flanks of which are generally steep (Fig. 66). They are usually permeable and soils tend to be poor, though pressure of population enforces their cultivation. Lower down finer alluvium fills the marshy valley-floor, and where streams debouch from the hills fans of coarser material are formed. These relations are suggested by Fig. 65, which it should be noted does not represent any actual area, though all features shown are found on each of the several SOI 1/63,360 sheets.

[11] de Terra, 116–18. In this section, *karewas* = topographical, Karewas = geological.
[12] Note in this connection the directions of the Lidder and the tributaries joining the Chenab at the Kishtwar bend.
[13] de Terra, table at 224; for general glacial sequence see above, 27–28.

The climate is naturally continental, the severity of the winter being increased by drainage of cold air down the encircling slopes, and by radiation. Srinagar lies at 5200 ft and its climate is more extreme than that of hill stations lying 2000 ft higher on the outer Himalayan ridges:

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Fig. 63.—Kashmir or the Vale of Kashmir. 1, mountain outlines (lower in S, gaps or cols in N); 2, foothills; 3, moraine; 4, dunes; 5, alluvial cone; 6, willows, poplars, orchards; 7, stream beds; 8, irrigation channels (main); 9, main road/railway; 10, springs. All black areas cultivated except ravines and banks of harmukh (cf. Fig. 66). Altitudes above 5000 ft along Jhelum, plus an upper complex of harmukh, dome-peak on hills. This map does not represent any specific year.

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433 668 *India's*. The importance of Kashmir water to W Punjab, for both irrigation and power, has been stressed already; Kashmiri timber was also very important to W Punjab, and conversely had its main outlet there, since exploitation depended largely on rafting down the rivers which all flowed into W Punjab. The Sialkot sports goods industry used Kashmir willow and resin. The import of salt for the Kashmir tanneries is also more costly from *India* than from the Salt Range mines, and Pakistan would obviously find it easier to supply the food deficit than would *India*. Oil is essential for transport into the Vale, and Pakistanis claim that the natural supply would be from Attock or SW Asia through Karachi.

491 The natural links of Kashmir are mainly with W Punjab. All roads are difficult to maintain, but the Jhelum route is really the only all-weather one. It is only 185 miles from Srinagar to Rawalpindi, 250 to Amritsar, and the *Indian* route is badly snow-bound (or at least impeded) for three months on the Banihal Pass, while its sub-Himalayan stretch lies athwart the drainage of an area notoriously liable to gullying and landslips. Fruit and timber were the largest exports from Kashmir, and while Pakistan has far more potential resources in temperate fruits than has *India*, the timber situation is the reverse.

631 668 Six years after the original outbreak no solution of this not so cold war was remotely in sight. At this stage Shaik Abdullah showed signs of playing his own hand and was obviously reluctant to enter the *Indian* union on the same terms as the other states; indeed he secured substantial constitutional concessions. His supersession further inflamed Pakistani feeling, fearful of a *fait accompli*; but at the same time the crisis held a clear warning that *India* also could overplay her hand *vis-à-vis* the Kashmiris. Hence the dramatic suddenness with which, in August, 1953, both countries agreed at last on a time limit—twelve months—for the ever-receding plebiscite.

But the organization of it will raise difficulties. Is it to be a simple yes or no, *India* or Pakistan? If the Kashmiris are to decide, it might be that they should have the option of opting for neither, risky as that might be. *India* and Pakistan are likely to be at one in vetoing this, if in nothing else. Then again neither side, for internal political reasons, could well accept complete cession as a result of a possibly narrow adverse majority. However unsatisfactory, and however difficult it is to decide on the basic units, partition seems the only way out.

Indus Kohistan and Gilgit

Nanga Parbat and the Gorge

183 Nanga Parbat, the mighty NW pillar of the Great Himalaya, is almost separated from the main mass by the valleys of the Kishan Ganga and the

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Astor, between which lies the Burzil Pass; and to the N and E it is moated 133
by the deep gash of the Indus gorges. In several ways it differs from the main mass. "Located at a structural interference of two major geanticlines, both of which have undergone repeated uplift in the Quaternary", it consists of a core of granitoid gneiss with a "massive envelope" of sedimentary gneisses; the strike is N/S (probably the result of its situation on the syntaxis) instead of the normal NW/SE of the Kashmir Himalaya. There are no signs of nappes here, but to the N late Tertiary and even early Quaternary sandstones are folded in a steep syncline along the Indus Valley: "thus this very young folding appears here locally in the crystalline inner zone." [20]

The massif carries about 100 sq mls of snow-fields, draining into small glaciers descending nearly 8000 ft below the snow-line. Several erosion platforms can be traced, especially notable at just over 13,000 ft "where the rounded and flattened ridges and broad rudimentary Valleys, cut short in front, resemble the old morphology of the Deosai plateau." [21] Nevertheless perhaps no mountain in the world is quite so impressive; certainly not Everest, perhaps not even K2. This is due to the intense erosion around it: the land falls to the N by 23,100 ft in 14½ miles, 20,600 in 17 to the W, 19,600 in 14 to the E; the relatively gentle Sn declivity is about 650 ft per mile. Vast moraines and talus slopes hardly soften a relief which includes precipices of 12,000–13,000 ft nicked by tiny hanging valleys and glaciers.

Round this massif the Indus flows in gorges 15,000–17,000 ft deep and only 12–16 miles wide. The floor itself is relatively wide and flattish, hot and arid, "a desert embedded between icy gravels". It was formerly fairly peopled, but ruined by the great flood of 1841 when the gorge was blocked by a landslide on the Hattu Pir cliff near the Astor confluence: the burst swept away a Sikh army on the river-bed at Attock. The Hattu Pir is "scarred with the remains of the many difficultly aligned and skilfully built paths, most of which have fallen hundreds of feet into the river below. . . . A heavy rock, stone shoot, or sharp shower of rain, any one of these is enough to destroy the tenderly cared-for road." [22] Round Bunji there are three to five gravel terraces lying on sands which seem to indicate a former lake—a point of some importance in connection with the Potwar erratics problem (below, 443).

This is Indus Kohistan—emphatically the 'land of mountains' in a mountainous land. In the tributary valleys are a few isolated villages, dependent on buckwheat and *grim*; in much of the gorge the walls are too steep to carry a track except at 4000–5000 ft or more above the river, and

[20] de Terra, 931; P. Misch and W. Raechl in "Scientific Work of the German Himalaya Expedition to Nanga Parbat, 1934", *HJ* VII (1935), 44–52.

[21] Raechl, *loc. cit.*, 47–48.

[22] R. C. F. Schomberg, *Between the Oxus and the Indus* (1935), 16–17; see pp. 29–30 for an amusing account of the difficulties of managing the swinging bridges—up to 100 yards long—made of birch- or willow-bark ropes.

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133 communication—impossible in winter—is easier (*le mot juste?*) over the shoulders of the mountains.

133 241 The Astor Valley marks the transition from the vivid colours of rock, field, and wood in the Vale to the desolate outer marches of Kashmir. Agriculture in this dry valley is carried up to 9000 ft by little irrigation channels, but low temperatures render it precarious: wheat, barley, pulses, maize, buckwheat, lucerne, and other fodder crops are grown.

Gilgit

631 Beyond the Indus lies Gilgit, and around it the Frontier Illaqas, more or less feudatory to Kashmir. Although we have it on the high authority of Holdich that where small parties of Buddhist pilgrims "made their way with infinite pain and difficulty to the great monasteries of the Peshawar plains, no military force of any consequence ever has, or ever could, follow their footsteps",[23] nervousness about Russian intentions led to the preservation of the long panhandle of Afghan territory, 15–25 miles wide, in Wakhan, the valley of the Ab-i-Panja branch of the Oxus, and at no point did the two great Empires actually touch.

Outside Gilgit itself the area is held by a congeries of petty tribal republics and chieftaincies of which Hunza is the most important; Schomberg gives them all (except Hunza and Yasin) a bad name for turbulence, murder, intrigue, avarice, dishonesty, laziness, stupidity, and general backwardness. 161 The population is very slight, in Gilgit and the frontier some 120,000 in all on 18,000 sq mls; the density in Astor is 10, Gilgit proper 15, Frontier Illaqas 4. But in relation to cultivated area it is a different story—in 1901 the Gilgit density was 1295.

361 241 Settlement is usually on little terraces in the better valleys; one such is occupied by Gilgit itself, a nodal centre near the junction of the Gilgit and Hunza Rivers, which between them drain nearly the whole area between the Indus and the 20,000–22,000 ft peaks of the Hindu Kush. At Gilgit rice and cotton are grown as well as the usual montane crops and fruits; higher up Yasin has even a tiny export of wheat and barley. Hunza is even better: 30–40 sq mls of tiny terraced fields, orchards and poplars, and "curling along the bleak stony hillsides" carefully engineered *kuls* provided with little tunnels for the escape of scree from the slopes above. "All are of dry masonry, all have been built without scientific aid, with nothing more than industry, common sense, and the usual tools of a peasant; ibex horns were chiefly used." Fruit culture is of the utmost importance to life in these valleys, and above all the apricot, according to Schomberg the sole diet for weeks on end.[24]

[23] *India* (1904), 105; but cf. Sir Aurel Stein, "A Chinese Expedition across the Pamirs and Hindukush, A.D. 747", *GJ* LIX (1922), 112–31. Lord Ronaldshay (*Lands of the Thunderbolt* (1923), 141) aptly calls Gilgit and Chitral "listening-posts in the vast system of natural defences which keep silent and eternal watch over the teeming plains of Hindustan."

[24] Schomberg, *op. cit.*, 59–60, 112–23.

4/1 [i.e., of Indus Kohistan -- ANALYST]

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The Great Himalaya and the Zaskar Range

The Great Himalaya may be taken as commencing in the Indus bend; across that river, in Swat, the strike is swung round by the syntaxis and is practically at right angles to the NW/SE trend of the main range. From the Zoji La to the Indus the really high ground (over 15,000 ft) is broken into a number of distinct massifs, of which Nanga Parbat is by far the most conspicuous; E of the Zoji La the passes are nowhere below 15,000 ft until the great break of the Sutlej/Spiti Valley—a distance of 250 miles, in which there are several peaks over 21,000 ft. To the S are the En continuation of the Pir Panjal (here 15,000–18,000 ft), beyond the Chandra-upper Chenab Valley, and S again the Dhaoladhar (10,000–15,000) with the upper Ravi between it and the Pir Panjal; the Beas itself as a whole cuts across the trend, with longitudinal stretches. Between the Great Himalaya and the Indus the same lines are well shown in the Zaskar Range[35] and its reticulate drainage pattern, e.g. the Sn Shigar, the headstreams of the Zaskar River, and the valleys of inland drainage in Rupshu.

"As a tectonic unit, the Great Himalaya is made up of the roots of the Kashmir nappe, the principal geanticline within the main Himalayan geosyncline, consisting of the Archaean and pre-Cambrian sedimentary rocks together with large bodies of intrusive granites and basic masses." [36] The granitic intrusions are post-Cretaceous, perhaps associated with the actual orogeny, and the thrusts of this area are not comparable with the great nappes of the central and En Himalaya, so far as is yet known.

The area N of the main axis is more interesting. The higher Zaskar peaks are seated upon a broad plateau-like range, much dissected, at about 19,500 ft. More definite erosion surfaces are found in Rupshu, round the enclosed basin of Tso Morari, at 16,600 ft, and in the NW the Deosai Plains lie at about 13,000. It is probable that these areas of rolling mature or late-mature terrain are merely the clearest expression of platforms of much greater extent—in Deosai the country intermediate between the deeper valleys and the 15,000 ft plus massifs from Nanga Parbat to the Zoji, and possibly connected with the Pir Panjal surface S of the Vale.[37]

The human geography is naturally almost nil. In the wide open valleys of Rupshu—the lowest are around 13,500 ft—some barley is grown, and here, above Tso Morari, is Korzok, at 15,000 ft claimed as the highest agricultural settlement in the world.[38] A little borax is produced from the saline lakes.

[35] Range nomenclature as on SOI 1/1M sheets 43 (Srinagar), 52 (Leh), 53 (Delhi); but Zaskar is often spelt Zanskar, Dhaoladhar Dhauladhar (both the latter in SOI.)

[36] D. N. Wadia, *op. cit.* (1939), 312.

[37] de Terra, "Physiographic Results of a Recent Survey in Little Tibet", *GR* XXIV (1934), 12–41; refces at 21, 34. From now on citations from de Terra refer to this paper.

[38] According to S. D. Pant (*The Social Economy of the Himalayans* (1935), 9, 41) the highest settlement of any description is the pastoral steading of Lwan, N of the Kumaon Himalaya at 19,000 ft.

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433 Zaskar also has its patches of cultivation, and is noted for its hardy ponies. The Deosai Plains "are mournful stretches of grass and stones, with many a bog difficult to cross, and uninhabited but for the marmots, an occasional bear, and swarms of big black gnats. The absence of wood for fuel, the distance from human habitations, and local superstitions regarding 'the devil's place' prevent the people from using the pastures." Such population as 221 there is in the Himalaya/Zaskar region is largely nomadic, and the shep- 132 herds of Rupshu "complain bitterly of the heat of Leh"—average annual temperature 40·9° F.![29]

Ladakh and Baltistan: The Indus Furrow

The Indus and the Ladakh Range: 'Little Tibet'

133 The Indus rises on the Nn flanks of the Kailas Range, and flows in a great Nly curve until it breaks through that range to the Gartang confluence; this tributary continues the line of the main river through Kashmir, occupying a narrow corridor between the Kailas and En Ladakh Ranges. Below the confluence the Indus holds on a generally straight SE–NW course until the Gilgit joins it at Bunji and it turns to round Nanga Parbat. S of Lake Pangong, however, it makes a sharp bend and cuts through the Ladakh Range,[30] which it pierces again above the Shyok confluence. This great furrow is on the whole fairly graded; from the Gartang confluence to Bunji (*c.* 450 miles) the fall is only from *c.* 13,800 to 4600 ft, or about 20 ft per mile. Alluvial flats are found in the extreme E of its Kashmir course, at about 13,800 ft. In the E—Ladakh proper—the whole catchment as well as the immediate valley is narrow, constricted between the closed basins of Pangong and Morari; but in Baltistan the catchment widens somewhat. At Skardu, where the Nn Shigar comes in a few miles below the Shyok, the Indus is often over 500 ft wide and 9–10 ft deep even in winter.

The Ladakh Range between the two Indus gaps forms a remarkably straight wall for some 190 miles: Indus and Shyok flow parallel 25–30 miles apart, and between them the range rises 10,000 ft or more to a rather even crest at 19,000 ft. Again the flanks, gentler on the N, carry evidences of a pre-glacial mature relief: "at 17,450 ft a rolling surface with valleys one to two miles in width separated by low divides . . . head-waters moving sluggishly around sand bars until they break through the terminal moraine walls and fall at a rate of 1600 ft per mile through boulder-choked gorges." The relations between the abrupt steps—often of 1000 ft—in the valley-floors and the moraines indicate that these are old erosion levels, independent of ice action, but affected by inter-glacial uplift. The pre-glacial Indus

[29] *Kashmir Gaz.*, 3, 105.

[30] de Terra, however, thinks that the Range bends sharply from NW/SE to W/E just here (18–19, 22, 40, and Fig. 6), and his arguments seem valid. But for convenience the accepted nomenclature of the SOI maps is retained.

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valley-floor "must have been at the level of the flat spurs, which now are 3000 to 4000 ft above the valley." [21] The valley and foothills are largely formed of Eocene beds, dissected into sharp ridges which contrast strongly with the bolder granite forms of the mountain wall.

Climate

The climate of Ladakh may be illustrated by the figures for Leh, on a fan in the Indus Valley at 11,500 ft:

Temperature ° *F.*

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	
17·3	18·8	30·9	42·9	49·8	57·8	62·6	61·0	53·7	42·7	32·1	22·1	Ra. 45·3

Precipitation, inches

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	
0·4	0·3	0·3	0·2	0·2	0·2	0·5	0·5	0·3	0·2	0·0	0·2	Tot. 3·2

The absolute minimum is about minus 19° F.; mean annual pressure 20 ins.; mean relative humidity *c.* 40% from May to November, *c.* 70% in winter.[22] Farther W, around Skardu, conditions are a little less extreme. In the thin atmosphere insolation and radiation alike take place at an extreme tempo; mechanical disintegration of the rocks is rapid, and the saying that a bare-headed man with his feet in the shade can get sunstroke and frostbite simultaneously is hardly an exaggeration. Aspect and diurnal variation are of the greatest importance; many streams even in summer flow for only a few hours a day when the ice melts in their gravel beds. Vegetation is extremely thin: a few bushes, a kind of furze (*burtse*), stunted cedars, willows, alpine pasture: "timber and fuel are the most pressing wants of the people."

But it must be remembered that here climate, like nearly everything else, is 'vertical' and the mountains receive a fair precipitation: "the vertical diversity of the climate makes human life possible in Indian Tibet. To the east, where the mountain ranges die out, the country is too dry for any permanent settlement." [23] Without the glaciers and snow-fields even the W would be a desert; and even so the life of the region is in a sense an oasis and caravan life.

The Human Response

We are really neither in *India* nor in Pakistan, but in Tibet: Baltistan, it is true, is mainly Muslim, but in Ladakh proper are two-thirds of the sub-continent's 64,000 Buddhists, and Buddhist culture extends as far W as Kargil in the Dras valley.

[21] de Terra, 33–36.
[22] W. G. Kendrew, *The Climates of the Continents* (1937 ed.), 150–51.
[23] G. E. Hutchinson, *op. cit.*, 127–28.

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●133 The Indus furrow is in general broken, rocky, barren, and dry. But every snow-fed tributary builds its fan, and where there is enough water the stream is split into radiating channels: "the living greens of apricots, willow trees, and little fields of barley make the surrounding desert appear uniformly parched and brown." E of Leh the Indus flows for 20 miles along a fault which brings it against the softer Eocene rocks; here there is a little alluvial plain and the fans "end abruptly against swampy fields, so that a man can stand with one foot in a desert and the other on damp green [167] grass". This is perhaps the best-peopled part of the region, which has an average density of 4. The plain is dominated by Hemis Gompa, the most important Buddhist monastery of Little Tibet.

241 Beardless *grim* barley is the dominant crop, and can be grown to nearly 15,000 ft; at lower altitudes two crops a year may be possible, as the plant matures very quickly. Wheat, buckwheat, pulses, roots, and lucerne are grown in sandy carefully-manured soils; new soil is brought to the fields from hill-side pockets, or sprinkled on the snow to melt it when it lies late. Ploughing and transport are mostly by the *dzo*, the offspring of the cow and the yak bull. The grain is ground by water-mills of rough but ingenious construction.[34]

221 511 771 The people are in part nomadic—the Champa herders of sheep and yaks—but the Ladakhis proper are for the most part settled agriculturalists. Although they are often in debt to the monasteries, these are apparently very amenable creditors, and the peasantry is on the whole much more prosperous than the Muslim Baltis down-river; there seems little doubt that this is mainly due to the check on population provided by polyandry and monasticism. The whole atmosphere is Mahayana Buddhist, and the most prominent features of the cultural landscape, after the irrigated fans, are the monasteries, the innumerable *chorten* shrines, prayer wheels, fluttering streamers to affright the demons, and the long piles of *mani* stones on the approaches to villages: "heaps of rubble, shaped like sheds, with a width of twenty feet, a height of five or six, and a length of from fifty to a thousand . . . covered with hundreds of flat stones on each one of which the lamas had inscribed the universal prayer" *om mani padme hum*.[35] Hard as life is, swayed by the most fantastic demonolatry, the people have their full share of the usual Buddhist—or Mongol—cheerful good-fellowship, and are not without amenities: festivals in the winter and, in the short slack season as the barley grows, a living and intricate religious art of painting and dance.

491 433 In normal times the transit trade was an important source of income: through Skardu lies the trail to the Muztagh Pass and Kashgar; at Leh, a

[34] Details and illustration in Hutchinson, *op. cit.*, 91–94.
[35] E. Huntington, *The Pulse of Asia* (1907), 58–60; cf. G. Dainelli, *Buddhists and Glaciers of Western Tibet* (1933), 41–90, an admirably vivid description.

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pleasant little caravanserai town, converge the roads from the Zoji La and the high Himachal Pradesh passes, the Indus road into Tibet itself and eventually to Lhasa, and the route via the Saser and Karakoram Passes (17,480 and 18,290 ft) into Sinkiang. Leh owes its importance mainly to the unusual size of its fan—5 miles wide and 1000 ft thick; purely Tibetan in aspect, it is dominated by the palace of the old Ladakhi kings, a miniature of the Potala at Lhasa.[36] But the Sinkiang trade has been declining for years with the increasing pull of Soviet Asia, and the war in Kashmir has disrupted the external contacts of this remote and fascinating little world.[37]

The Karakoram

Here, rather than on the Pamirs, is the Roof of the World, a mass of rock and ice extending for 250 miles from the Shyok to the Hunza, with the greatest assemblage in the world of giant peaks—33 over 24,000 ft—culminating in the tremendous keeps of the three Gasherbrum summits, all over 26,000, and finally K2 itself (Fig. 67). K2 (Mt Godwin Austen) is an almost regular cone of ice and limestone on a granite/gneiss base; at 28,250 ft it is exceeded only by Everest, but the latter has no such spectacular company of high peaks around it, and "above all it does not display such an immensity of silence and desolation".[38] The very passes are rarely lower than the summit of Mt Blanc (15,782 ft) and several are over 18,000; though some of those shown on the map are probably topographical cols rather than passes in a real sense, the W Muztagh, at 19,030 ft, is certainly the highest trade route in the world. The name Karakoram means 'black gravel' and has been extended from the relatively subdued terrain—at 18,000–20,000 ft!—around the Karakoram Pass in the E.[39] Geomorphologically the region is intensely interesting; its human geography is obviously almost non-existent, but what there is may fairly be called heroic.

As we have seen (Ch. I, 16, 25–26), the Karakoram is probably much older than the Himalaya, as shown for example by the absence of Tertiary sediments between Ladakh and the Nn flank of the Kunlun. Its actual relations with the other ranges of the great orogeny remain obscure; to the NW the Karakoram Ranges abut onto the Pamir/Hindu Kush in a country of very confused topography, while their continuation to the SE is still debateable, but probably via the Pangong Range into the Kailas. The divergence of Himalayan and Karakoram trends is most clearly seen N of the Shyok, but de Terra, who regards the Ladakh Range as the first member of the Karakoram system, draws attention to the swing from NW/SE to W/E

[36] See plate 2 p. 74 of Desnelli, *op. cit.*

[37] This is dealt with in M. Geary, "Western Tibet" (London Ph.D. thesis, 1948)—a full and admirable study which I have regretfully refrained from using for reasons of space.

[38] F. Grenard, *Haute Asie* (*Géographie Universelle*, Paris (1939) T.VIII), 343.

[39] Heights and range-names in this section from the beautiful map of the Karakoram (1/750,000) published by the Royal Geographical Society.

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133 about 78°35′ E in all four of his Karakoram Ranges—Ladakh, Pangong, Karakoram/Chang-chenmo, and Karakoram/Lingtzi-tang. This is in some degree paralleled by the Great Himalaya itself, and is shown very clearly in the outline of Pangong Lake, which apparently occupies a rift. The whole may well be controlled by the hidden margin of Gondwanaland.

Huntington noted that "the deep young inner gorge of the Shyok River grows shallower [to the N] and finally merges into the upland plain of Depsang",[40] and de Terra and others have refined on the earlier concept of

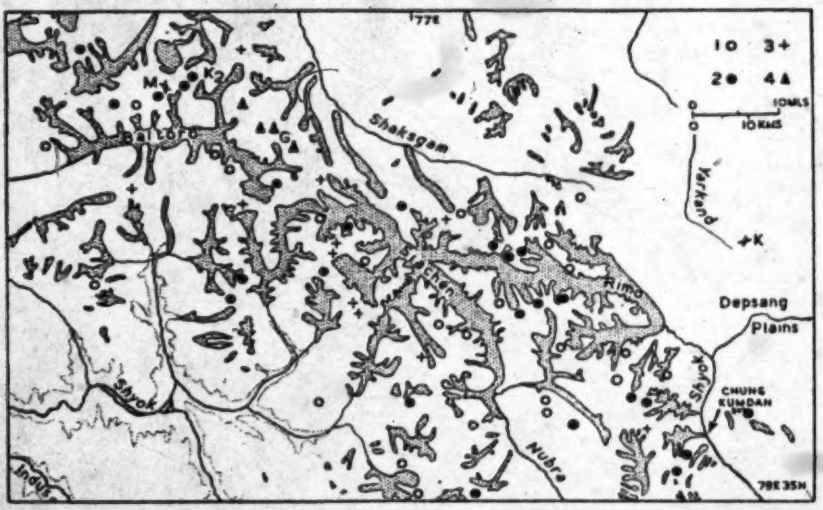

Fig. 67.—KARAKORAM: PEAKS AND GLACIERS. Glaciers dotted, dotted line 10,000 ft contour. M, Muztagh Pass; K, Karakoram Pass; G, Gasherbrum peaks. 1, peaks 20–22,000 ft; 2, 22–24,000; 3, 24–26,000; 4, 26–28,000; K2, 28,250 ft. Based on RGS map *The Karakoram* (1/750,000, 1939).

a vast peneplain dissected as a result of one major uplift; at least four erosion levels may be traced between the Muztagh peaks (*c.* 23,800 ft) and the Deosai/Pir Panjal platforms. The present drainage pattern is distinctly peculiar, especially in the Shyok, Nubra, Chang-chenmo, and Harong valleys; the Chang-chenmo in particular is a misfit, and there is also the through valley from Pangong to the Indus with its summit only 1600 ft above the lake at 13,900. Biological observations strongly support de Terra's view that all the valleys originally drained out to the SE; Hutchinson draws attention to the distribution of the hill barbel in the headwaters of Oxus, Indus, Tsang-po, Mekong, Yangtse, Hwang-ho, and the streams of the great enclosed basins of central Asia[41]:

[40] *Op. cit.*, 78; de Terra (1934), *passim*.

[41] G. E. Hutchinson, "Limnological Studies at High Altitudes in Ladakh", *Nature* (New Series) LXXVII (1933), 497–500; but less technically and more vividly in *The Clear Mirror* (148–52), from which I quote.

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But a grander event than simple river-capture must be sought . . . to explain the similarity of the inhabitants of the Indus and the Tsang-po. The flat-edged shoulders of the Chang-chenmo mountains, where butterflies circle around pinnacles of rock, suggest the nature of this occurrence, though they lie aridly in the air, far above the homes of the few fishes that inhabit the stream below. Such flat ridges represent the levels of the valley floors before the last upward movements of the mountains. . . . The remains of such valley floors may be found throughout Indian Tibet. They all record the same history. All the rivers of the land ran toward the Tibetan plateau. . . . Not until quite recent times, when the mountains rose high enough to cut off the rain from the inner deserts of Central Asia, were the more northern of these streams dried up. Then, across the ever-growing Himalayas, gorges were cut . . . draining away the waters of the older rivers. In this manner erosion and earth movements have moulded the pattern of the present Indus, and have cut out the path by which the traveller enters the western confines of Tibet.

The physical characteristics of the Karakoram glaciers have already been discussed (above, 26–28); we may note further the contrast between the generally clear ice of the En Himalayan glaciers, girdled by forest and alp, and the Karakoram icestreams set in barren disintegrating rock and hidden beneath a mass of debris and wind-borne dust. The rivers emerging from their snouts flow over, or more often through and under, great ribbons of shingle. In winter, of course, the entire landscape is frozen, rigid, dead; in summer the streams wake only when the weather is clear. Cloudiness reduces evaporation, and the cold drizzly rain melts little snow; but with a few hours' sun the streams come down in sudden dangerous freshets. The Shyok itself, "a clear rushing stream thirty feet wide", is intermittent in this fashion: "We looked again, but there was no river. Yet even as we were talking about it, a new stream came pouring down a dry channel, a red muddy flood of freshly melted snow." [42]

There is, however, much evidence, morainic and other, of significant climatic change. Pangong at present consists of several lakes separated by deltaic fans, and for the most part is saline; there is no outlet. But beaches at various levels up to 200 ft bear witness to great oscillations, the most notable of which (in the Riss-Würm interglacial) must have allowed it to drain into the Shyok; the tendency has been to desiccation, not without fluctuations. Thus the patina on a palaeolithic artefact from Kargil speaks of aridity, while the representation of deer (with yaks and ibexes) on the sculptured rock at Tankse in the Harong valley suggests that within very recent times conditions have been more favourable to human activity; no deer are now found nearer than the Vale. There was a drier period at Pangong in the last century, but in other places there seems to have been no significant change, to judge from patches of dead ice which have not altered much since 1848. [43]

[42] Huntington, *op. cit.*, 74. [43] Cf. also T. Longstaff, *This My Voyage* (1950), 165.

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Baltistan, the country between the Nn Shigar and the Nubra, is slightly more favoured than Ladakh, with *c.* 6 ins. precipitation and more glaciers; but it is still very harsh. The valleys at 8000–10,000 ft have a few patches of pine and deodar on the slopes, willow and poplar along the streams. Agriculture depends on the snow, which lies from mid-December to mid-March; in winter many villages are reached by the sun for barely an hour or two a day, but in summer the heat in the narrow rock-walled valleys—especially around Skardu—is intense. The usual crops, with ordinary and naked barley prominent, are grown, a spring and an autumn crop where water is sufficient. Lucerne, carefully tended, is important, but except for intensive manuring of the sandy soils farming is extremely primitive, and rotations unknown. The hot summer enables a wide variety of fruits—peaches, melons, grapes, above all apricots—and even a little tobacco to be grown. But the absence of the demographically restrictive social institutions of Ladakh keeps the Baltis miserably poor. Here and there washing for alluvial gold ekes out incomes a little, or at least enables revenue demands to be met.

To the E conditions get progressively worse. Around Pangong there are a few fields of barley and peas on the fans at 14,000 ft or a little more; at Tankse "the few houses that constitute the village seem to hide behind a little grove of willow trees planted on one side of a stream, as if these trees were the greatest treasure of a place that wished to put up a brave front, a green and damp façade, to the hostile dry world before it". But on the plateaus NE of Pangong even pastoralism is difficult. The Chang-chenmo Valley has some vegetation: tamarisks on the floodplain, *burtse* on the slopes, and just below the snow-line some flowering plants and patches of grass, shared by tame yaks and wild asses. Here and there hot springs "water the gravelly plains into producing a little green grass . . . so precious that each patch has a name." [44]

Yet this most negative of regions has its place in human history. The old trade to Yarkand and Kashgar is dead or dying, but at the hands of man himself: politics in Sinkiang and Kashmir are responsible for its decay, not the desolate leagues of rock and ice nor the murderous winds of the Karakoram. The passes are open for only five or six months of the twelve; but over them, carried on yaks or even sheep, travelled jade, hemp, and silk from China; from India goods from the bazaars of Srinagar and Amritsar, sugar and salt; borax from the dead lakes of Rupshu. Goods of less bulk, but to many of highest value, also traversed this, one of the strangest pilgrim routes of the world. Chinese disciples of the Enlightened One, seeking the shrines of Peshawar and Sarnath and Buddh Gaya or the libraries of Taxila, fought their bitter way over these savage gables of the world; and here too came Christian men, perhaps fleeing from the tide of Islam, per-

[44] Hutchinson, *op. cit.*, 106–07, 128–38. For the facts of the next paragraph, *ibid.*, 108–11.